960-970

Station	Main Studio	Freq	Power	Date
NEW	Milton, ON	960	0.5 kW/DA-1	3/28/68
NEW	Mont-Joli, QU	960	1 kW/DA-N	10/18/78
CFAC	Calgary, AB	960	50 kW/DA-N	7/29/70
CFAC	Calgary, AB	960	10 kW/DA-N	10/24/58
CFTJ	Cambridge, ON	960	1 kW/DA-1	5/8/79
CHNS	Halifax, NS	960	10 kW/DA-N	7/2/58
CKWS	Kingston, ON	960	5/10 kW/DA-2	6/27/69
KABL	Mount Pocono, PA	960	1 kW/DA-D	8/22/80
KABL	Mount Pocono, PA	960	5 kW/DA-1	6/16/59
KALE	Richland, WA	960	1/5 kW/DA-N	10/5/77
KARZ	Phoenix, AZ	960	5 kW/DA-N	8/26/66
KOVO	Provo, UT	960	1 kW/DA-N	4/2/48
KGIR	Cape Girardeau, MO	960	0.5/5 kW/DA-N	10/28/68
KGIR	Cape Girardeau, MO	960	0.5/1 kW/DA-N	4/14/49
KGKL	San Angelo, TX	960	1/5 kW/DA-N	1/31/46
KGWA	Enid, OK	960	1 kW/DA-1	2/26/48
KLAD	Klamath Falls, OR	960	5 kW/DA-N	3/29/78
KMA	Shenandoah, IA	960	5 kW/DA-N	9/4/59
KNEB	Scottsbluff, NE	960	0.5/1 kW/DA-2	9/12/50
KNEZ	Lompoc, CA	960	0.5 kW/DA-N	8/12/60
WABG	Greenwood, MS	960	0.5/1 kW/DA-N	5/17/50
WBOC	Salisbury, MD	960	1/5 kW/DA-2	11/28/55
WBRC	Birmingham, AL	960	5 kW/DA-N	3/22/71
WDLM	East Moline, IL	960	1 kW/DA-D	4/29/69
WEAV	Plattsburgh, NY	960	5 kW/DA-2	9/28/79
WELI	New Haven, CT	960	1 kW/DA-N	9/47
WELI	New Haven, CT	960	5 kW/DA-N	3/3/58

960-970

Station	Main Studio	Freq	Power	Date
WFGL	Fitchburg, MA	960	1/2.5 kW/DA-2	8/22/80
WFIR	Roanoke, VA	960	5 kW/DA-N	2/51
WFTC	Kinston, NC	960	1/5 kW/DA-N	7/50
WGRO	Lake City, FL	960	1/0.5 kW/DA-N	9/28/79
WHYL	Carlisle, PA	960	5 kW/DA-D	10/1/75
WJAZ	Albany, GA	960	5 kW/DA-D	3/27/70
WRFC	Athens, GA	960	0.5 kW	11/3/50
WRFC	Athens, GA	960	0.5/1 kW	11/8/50
WSBT	South Bend, IN	960	5 kW/DA-2	9/28/79
WTCH	Shawano, WI	960	1 kW/DA-N	9/25/74
XEDF	Laredo, Tamps	960	0.1/0.5 kW/DA-1	6/6/56
CBZ	Fredericton, NB	970	10 kW/DA-N	5/17/74
CKCH	Hull, QU	970	5 kW/DA-1	12/3/54
CJYR	Edson, AB	970	10 kW/DA-1	8/28/67
CKCH	Hull, QU	970	10/5 kW/DA-2	11/30/81
KAKC	Tulsa, OK	970	1/2.5 kW/DA-2	9/12/80
KAKC	Tulsa, OK	970	0.5/1 kW/DA-2	12/12/58
KBEE	Modesto, CA	970	1 kW/DA-2	7/23/48
KBIS	Bakersfield, CA	970	1 kW/DA-2	5/20/75
KCHV	Coachella, CA	970	1/5 kW/DA-2	3/30/64
KIXL	Austin, TX	970	1 kW/DA-D	1/9/57
KNUU	Paradise, NV	970	0.5/5 kW/DA-2	8/22/80
KOIN	Portland, OR	970	5 kW/DA-N	9/8/48
KOOK	Billings, MT	970	5 kW/DA-N	3/22/55
KQAQ	Austin, MN	970	1 kW/DA-D	4/5/57
KQAQ	Austin, MN	970	0.5/5 kW/DA-2	3/8/61
KREM	Spokane, WA	970	1/5 kW/DA-N	9/28/79

960-970

Station	Main Studio	Freq	Power	Date
KREM	Spokane, WA	970	1/5 kW/DA-N	4/11/55
KSYL	Alexandria, LA	970	1 kW/DA-N	3/22/48
WAMD	Aberdeen, MD	970	0.5 kW/DA-2	6/11/56
WANV	Waynesboro, VA	970	1/5 kW/DA-2	1/29/64
WATH	Athens, OH	970	5 kW/DA-D	5/27/69
WAVE	Louisville, KY	970	5 kW/DA-2	5/8/61
WCSH	Portland, ME	970	5 kW/DA-N	5/2/47
WDAY	Fargo, ND	970	5 kW/DA-N	1/23/51
WEBR	Buffalo, NY	970	5 kW/DA-1	9/26/68
WFLA	Tampa, FL	970	5 kW/DA-2	11/12/75
WIIN	Atlanta, GA	970	5 kW/DA-D	6/26/57
WJMX	Florence, SC	970	1/5 kW/DA-N	11/30/49
WKHM	Jackson, MI	970	1 kW/DA-2	1/11/50
WMAY	Springfield, IL	970	0.5/1 kW/DA-2	8/24/62
WNTA	Newark, NJ	970	5/1 kW/DA-N	10/29/56
WOZN	Jacksonville, FL	970	1 kW/DA-D	12/15/60
WREO	Ashtabula, OH	970	1/5 kW/DA-2	3/22/71
WRKN	Brandon, MS	970	1 kW/DA-D	4/28/66
WTBF	Troy, AL	970	0.5/5 kW/DA-2	3/22/55
WWDJ	Hackensack, NJ	970	5 kW/DA-2	7/28/66
WWSW	Pittsburg, PA	970	5 kW/DA-2	5/11/48
NEW	Edson, AB	970	10 kW/DA-1	3/28/68
XEDF	Mexico, DF	970	5/10 kW/DA-N	11/29/62

ANTENNA DESCRIPTION SHEET

STATION CALL: NEW

MAIN STUDIO: Milton,Ontario

FREQUENCY: 960 Kc/s

POWER: 500 Watts Day and Night

CLASS: 111

MODE: DA-1

TIME: Unlimited

NOTI LOCATION LIST NO.: §.....840..... DATE March 11, 1968

GEOGRAPHICAL LOCATION: Latitude: N43° 27' 46"
Longitude: W79° 48' 56"

ARRAY CHARACTERISTICS: 6 guyed steel towers of uniform cross section, base insulated, series fed, no top loading.

TOWER:	1 N	2 NC	3 NW	4 SE	5 SC	6 S
HEIGHT:	171'(60°) all towers.					
CURRENT:	0.51	1.0	0.51	0.51	1.0	0.51
PHASE:	+155°	0°	-155°	+155°	0°	-155°

SPACING: Long sides=3-6;2-5;1-4=235° @ 220° Az.
Short sides=1-2-3; 4-5-6=50° @ 260° Az.

GROUND SYSTEM: 120 equally spaced copper radials per tower, buried 6-8" deep of average effective length of 410' (0.4 wavelength)

ORIENTATION: Towers 1-2-3 and 4-5-6 constitute the short sides of this parallelogram array and are at an azimuth of 260°. The long sides, towers 3-6, 2-5; 1-4 are at an azimuth of 220°

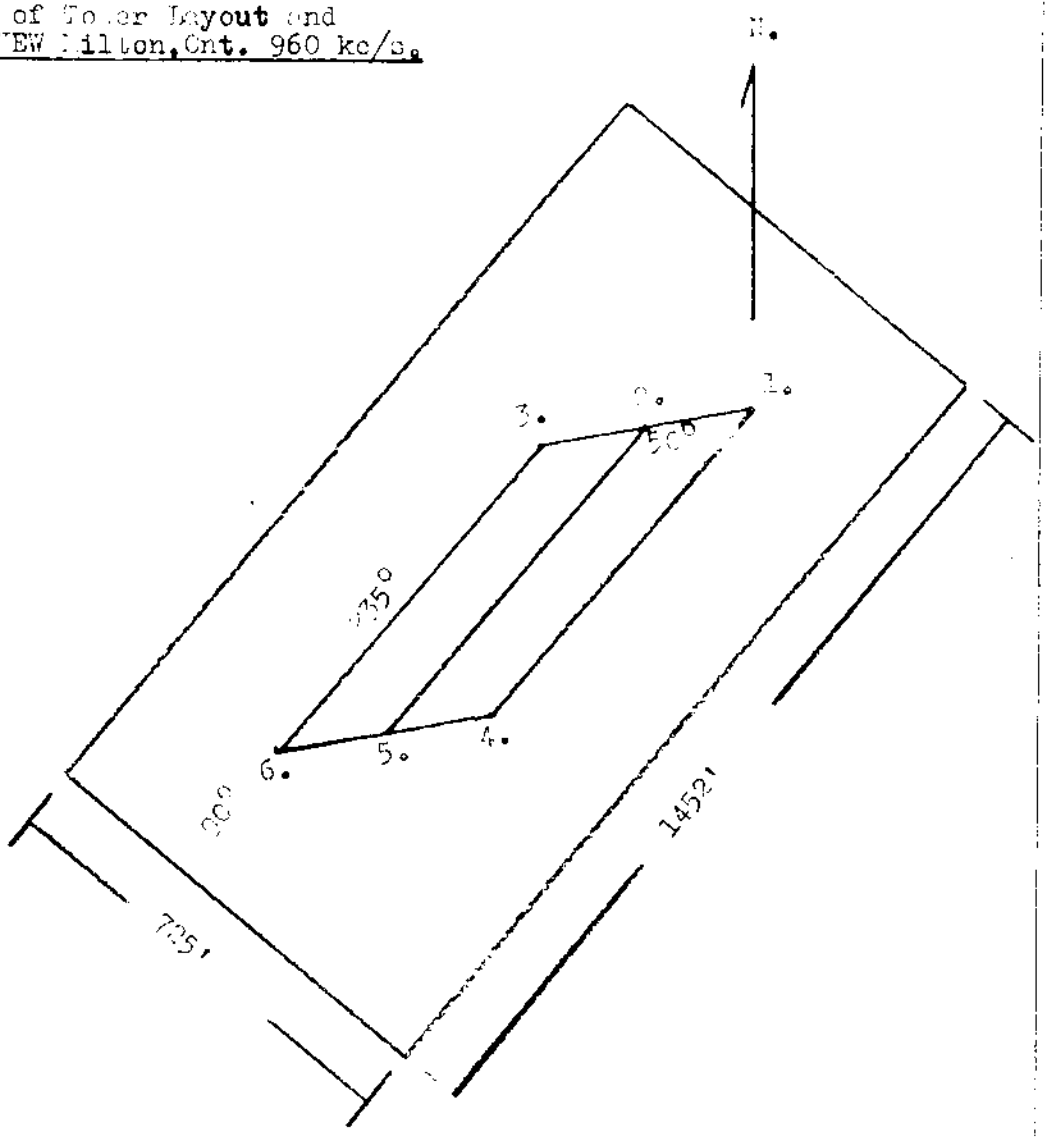
PREDICTED EFFICIENCY: 175 mv/m for 1 KW
123.6 mv/m for 0.5 KW.

Rev: Jan 19th/68

New Station
Milton, Ontario

500w,DA-1,U,Class III
960 kc

Sketch of Tower Layout and
Site: NEW Milton,Ont. 960 kc/s.



Parameter.

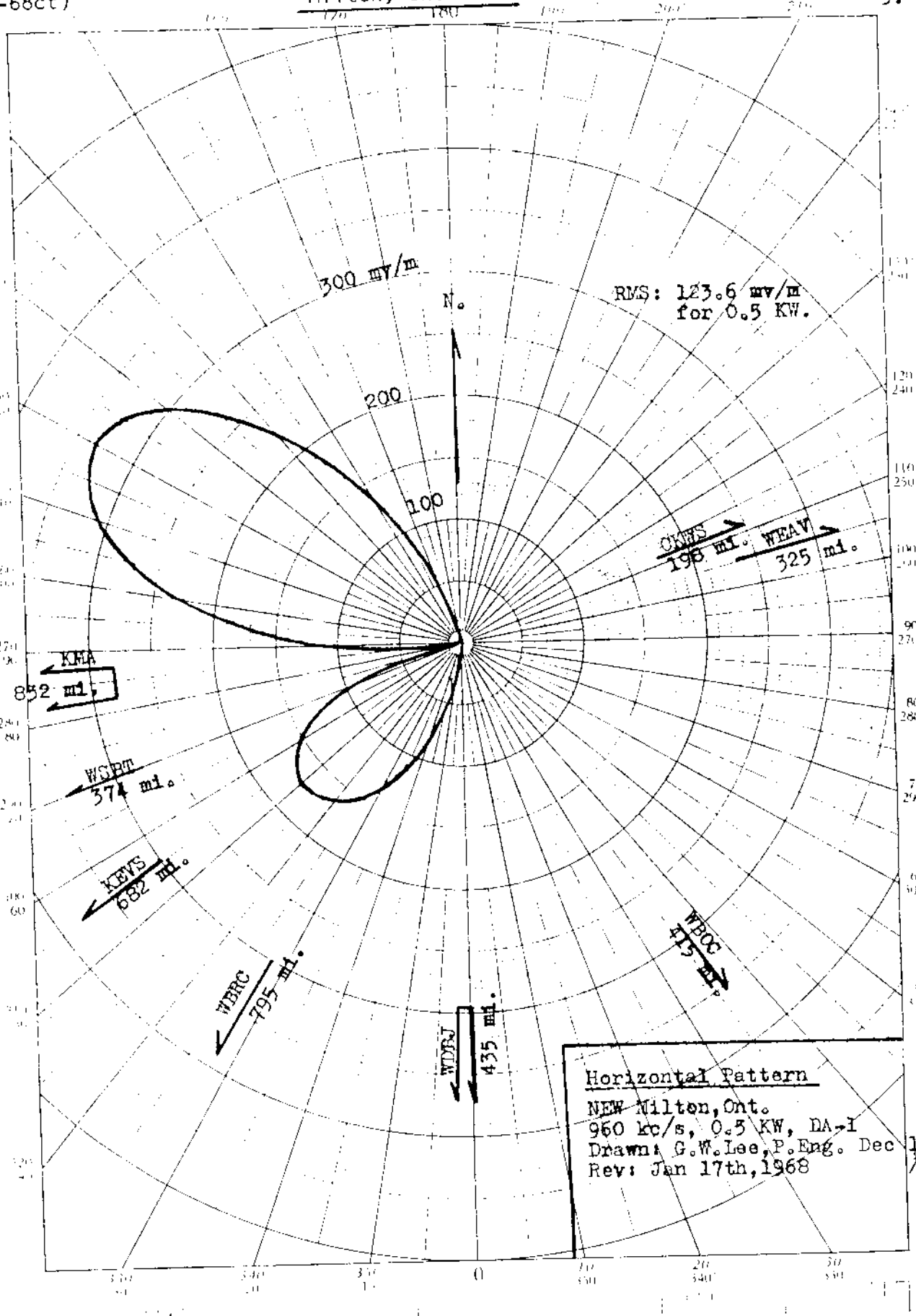
1=0.51/-155°
2=1.0/ 0°
3=0.51/-155°
4=0.51/-155°
5=1.0/ 0°
6=0.51/-155°

Long sides=735 ; 180°
Short sides =50° ; 260°

Proposed Day & Night
(3-28-68ct)

New Station
Milton, Ontario

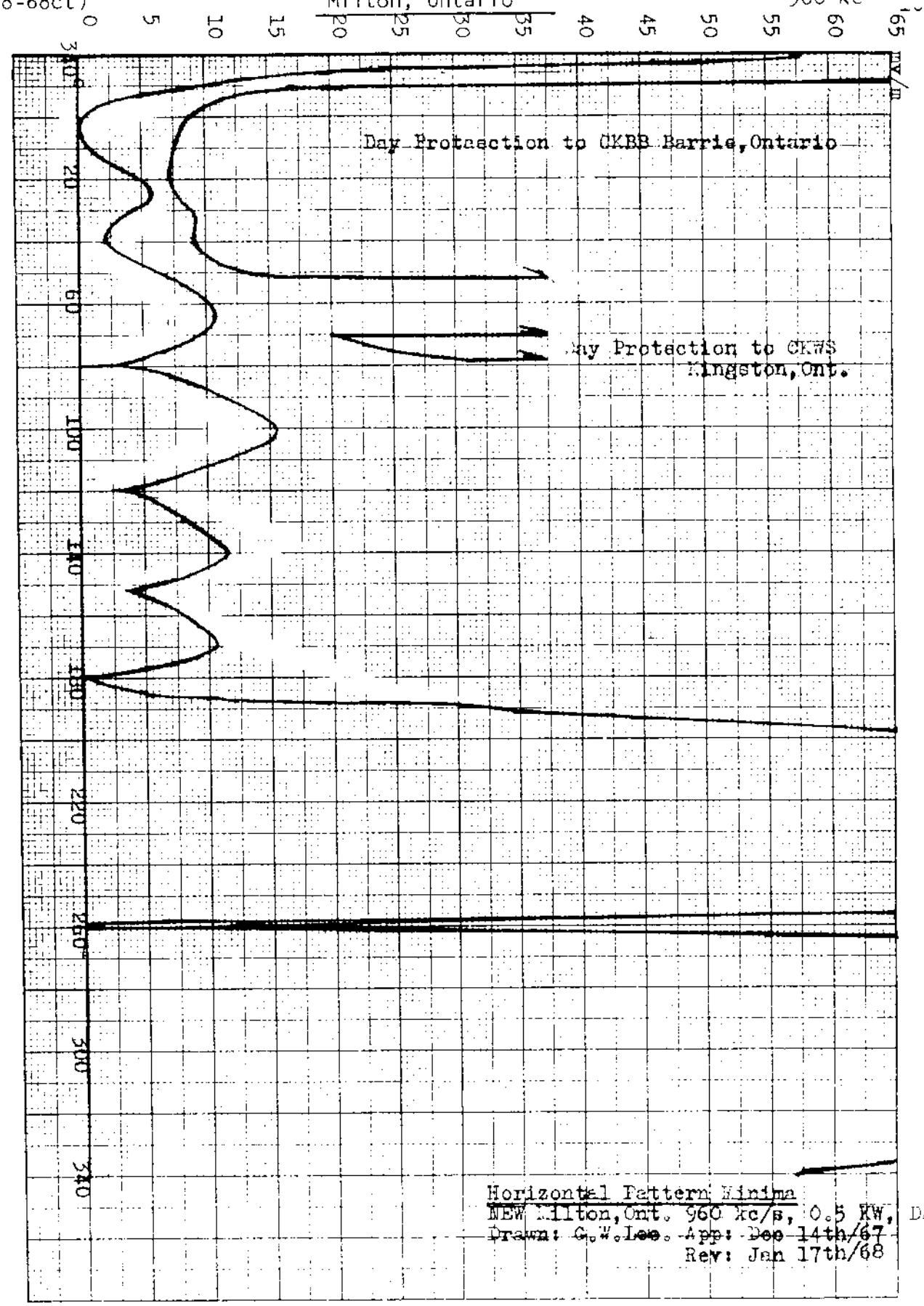
500w,DA-1,U,Class III
960 kc



Proposed Day & Night Nulls
(3-28-68ct)

New Station
Milton, Ontario

500w,DA-1,U,Class III
960 kc



Horizontal Pattern Minima
NEW Milton,Ont. 960 kc/s, 0.5 KW, DA-1
Drawn: G.W.Lee. App: Dec 14th/67
Rev: Jan 17th/68

DESCRIPTION

STATION	: Nouvelle	STUDIO PRINCIPAL:	Mont-Joli, Qué.
PUISSANCE	: 1 kW	FREQUENCE	: 960 kHz Classe III
LISTE D'AVIS NO:	377	DATE	: le 18 octobre 1978

EMPLACEMENT GEOGRAPHIQUE: Latitude nord : 48° 35' 24"
Longitude ouest: 68° 08' 20"

CARACTERISTIQUES D'ANTENNE

MODE D'OPERATION : AD-N

NOMBRE D'ELEMENTS: 2 de nuit, 1 de jour

GENRE D'ELEMENTS :

PYLONE	:	No. 1 (SE)	No. 2 (NO)
HAUTEUR AU-DESSUS DE L'ISOLATEUR	:	70°	70° (200', 60.96 m)
ESPACEMENT	:	Réf.	80° (227.8', 69.43 m)
ORIENTATION	:	Réf.	333.5°
PHASAGE	:	Réf.	-109°
RAPPORT D'INTENSITE DE CHAMP	:	1.00	0.90

EFFICACITE PREVUE : Jour 185 mV/m à 1 mille pour 1 kW
Nuit 195 mV/m à 1 mille pour 1 kW

MISE A LA TERRE : 120 fils no. 10 espacés équiangulairement enfouis environ 20 cm sous la surface d'une longueur équivalente à 0.4 λ avec courroie d'interconnexion à la bissectrice.

PROJET 4601

Pierre Labarre & Associés Ltée
St-Lambert, Qué., Canada

15 mars 1978

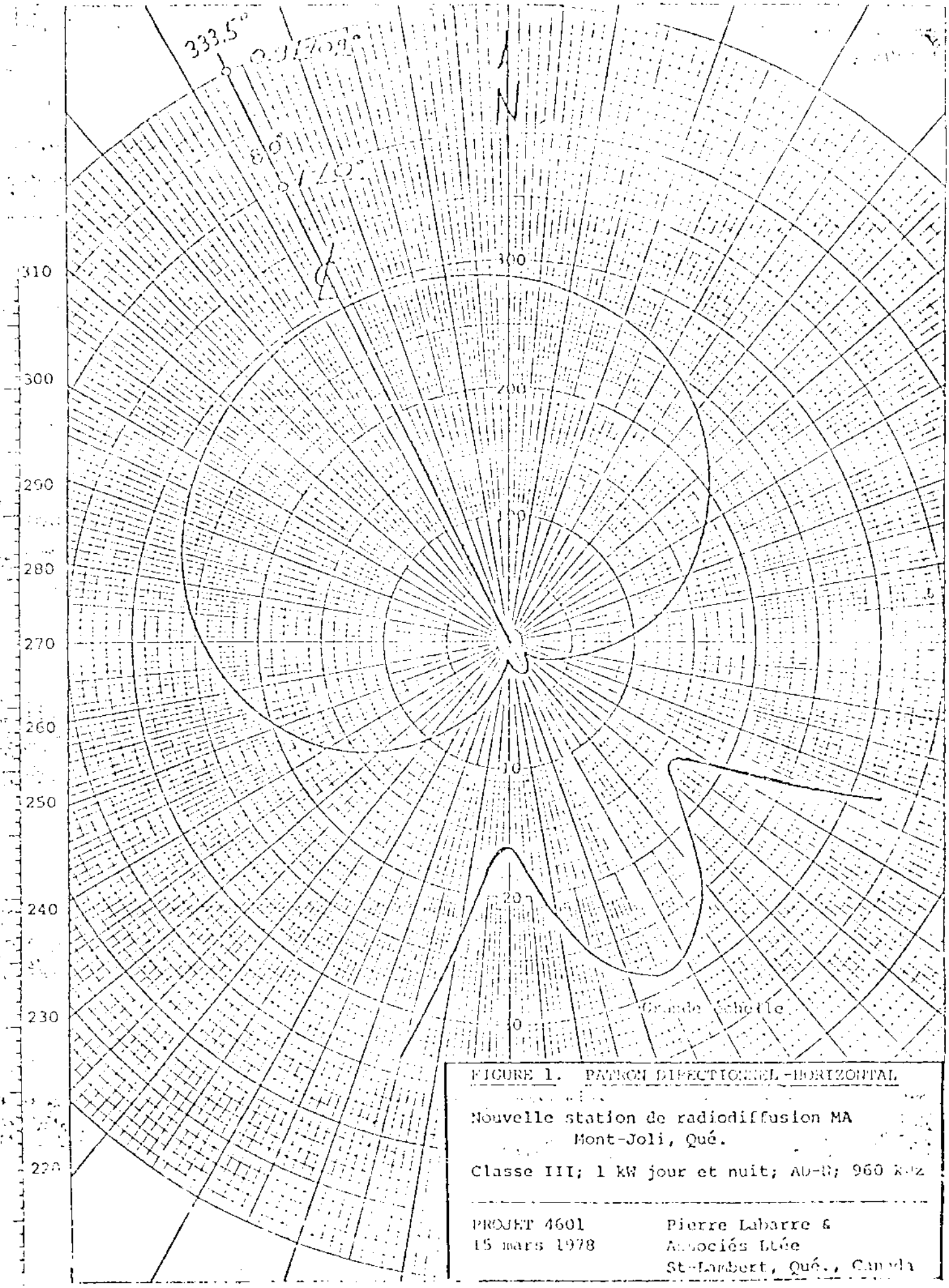


FIGURE 1. PATRON DIRECTIONNEL-HORIZONTAL

Nouvelle station de radiodiffusion MA
Mont-Joli, Qué.

Classe III; 1 kW jour et nuit; AD-N; 960 kHz

PROJET 4601
15 mars 1978

Pierre Labarre &
Associés Ltée
St-Lambert, Qué., Canada

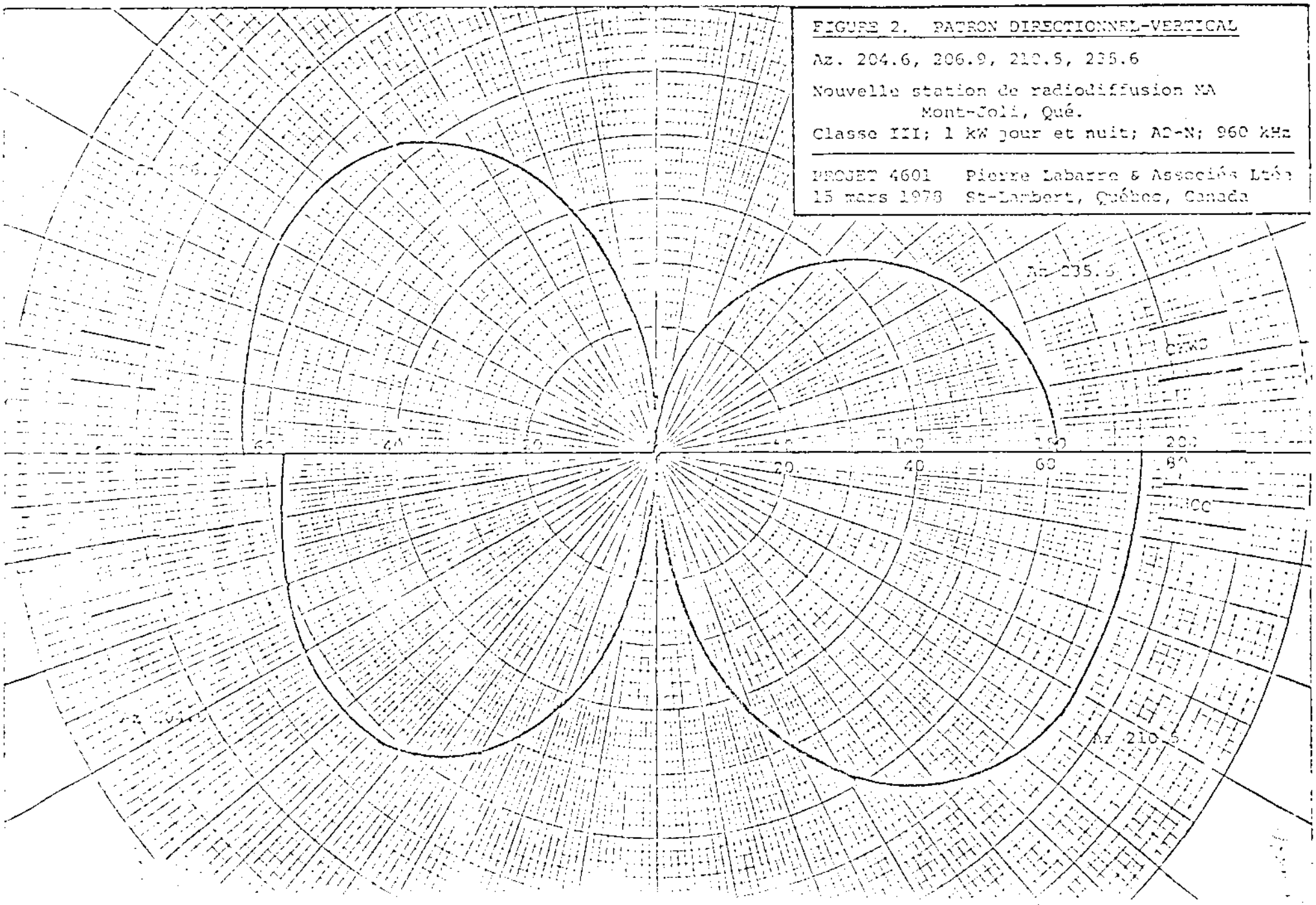


FIGURE 2. PATRON DIRECTIONNEL-VERTICAL

Az. 204.6, 206.9, 210.5, 235.6

Nouvelle station de radiodiffusion MA
Mont-Joli, Qué.

Classe III; 1 kW jour et nuit; AD-N; 960 kHz

PROJET 4601 Pierre Labarre & Associés Ltée
15 mars 1978 St-Lambert, Québec, Canada

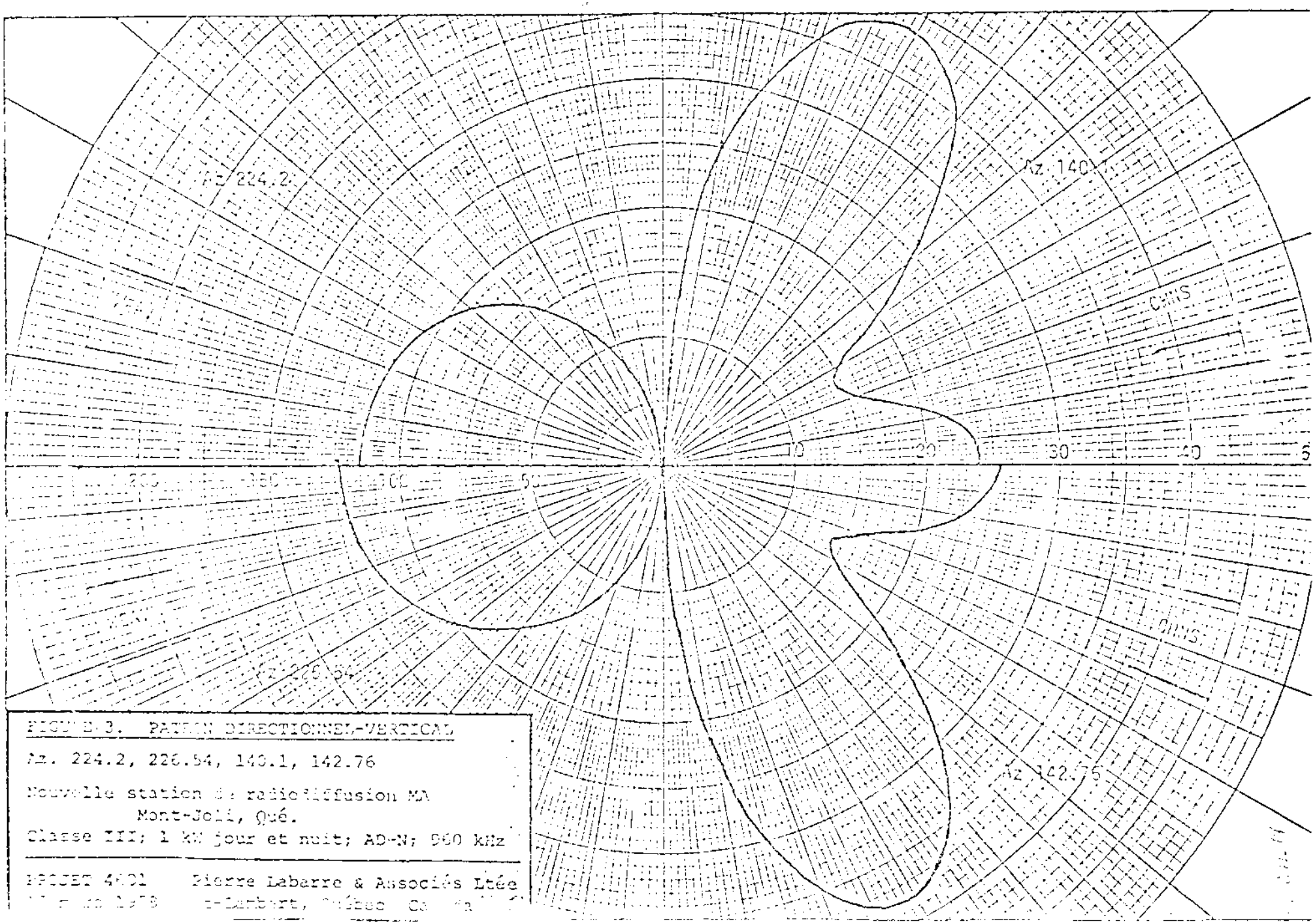


FIGURE B.3. PATRON DIRECTIONNEL-VERTICAL

Az. 224.2, 226.54, 140.1, 142.76

Nouvelle station de radiodiffusion MA
Mont-Joli, Qué.

Classe III; 1 kW jour et nuit; AD-N; 960 kHz

PROJET 4[illegible]01 Pierre Labarre & Associés Ltée
[illegible] de 1979 St-Lambert, Québec Canada

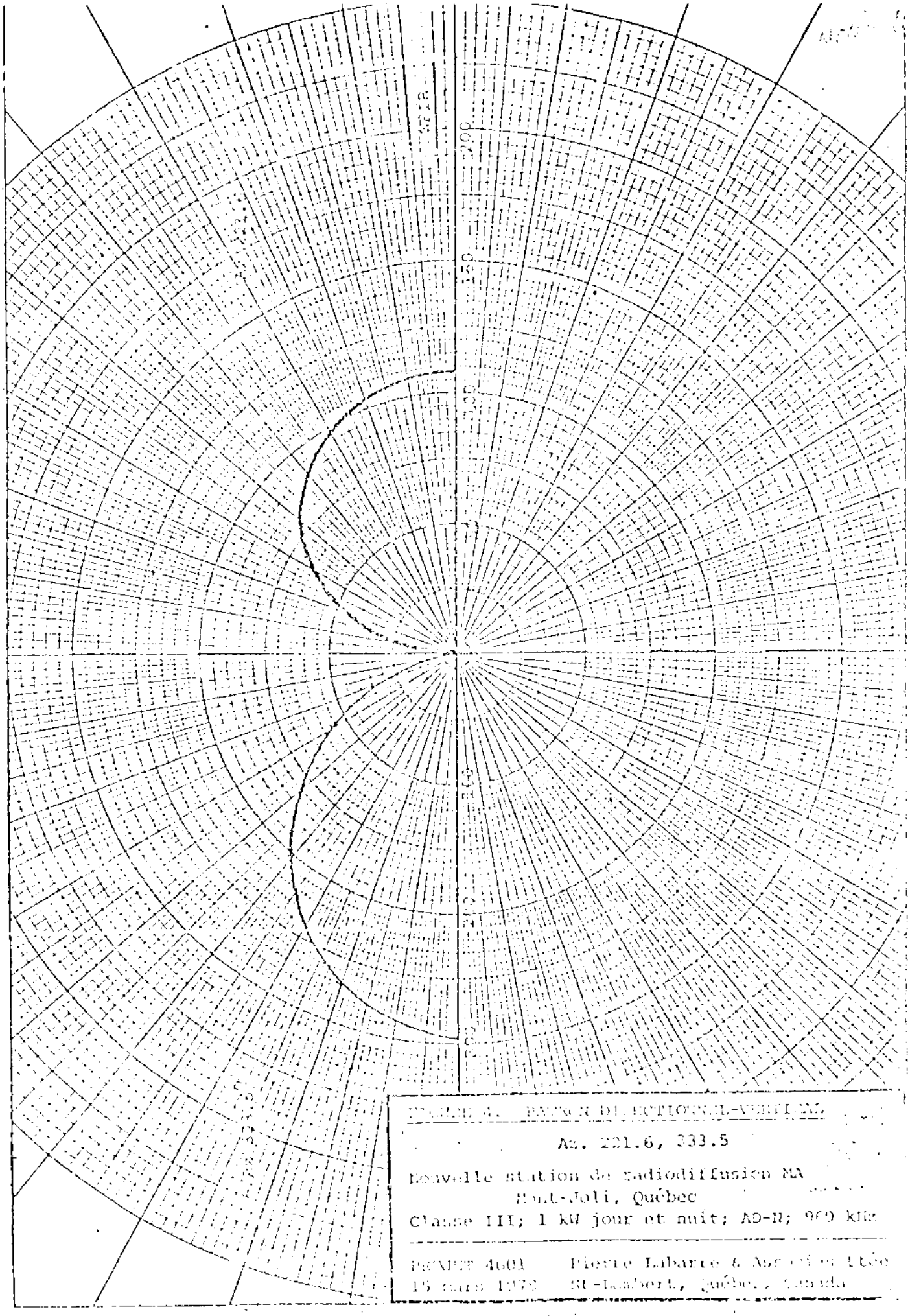


FIGURE 4. EMPRISE DIRECTIONNELLE-VERTICALE
Az. 221.6, 333.5
Nouvelle station de radiodiffusion MA
Mont-Joli, Québec
Classe III; 1 kW jour et nuit; AD-N; 969 kHz
PRNEF 4601
15 mars 1972
Pierre Libarce & Associés Ltée
St-Lambert, Québec, Canada

I - DESCRIPTION DU SYSTEME A ANTENNE DIRECTIONNELLE

1. LETTRES D'APPEL: (nouveau poste)

2. EMPLACEMENT: Mont-Joli, Qué.

3. FREQUENCE: 960 KHz.

4. PUISSANCE: 1 KW jour et nuit.

5. CLASSE: III.

6. NOTIFICATION NO: 359 DATE: October 4, 1976

7. COORDONNEES: Latitude nord: 48° 35' 15"

Longitude ouest: 68° 08' 01"

8. SYSTEME D'ANTENNE:

a) Fonctionnement: directionnel AD-N.

b) Type: deux (2) éléments à section triangulaire, haubanés et alimentés en série.

c) Mise à la terre: 120 fils #10 espacés également, d'une longueur équivalente à 0.4λ avec courroies d'interconnexion, le tout enfoui à env. 8" sous la surface.

9. MATS D'ANTENNE:

	#1 (SE)	#2 (NO)
Orientation (Az):	Réf.	333.5°
Hauteur au-dessus de l'isolateur:	70°	70° (200')
Espacement:	Réf.	60°
Phasage:	0°	-115°
Rapport d'intensité de champ:	1.00	0.96

10. EFFICACITE PREVUE:

a) Jour: 185.0 mV/m à 1 mille pour 1 KW.

b) Nuit: 180.0 mV/m à 1 mille pour 1 KW.

YVES R. HAMEL
INGENIEUR-CONSEIL
3772 AVENUE KENT,
MONTREAL, QUE. H3S 1N3

Revision: 14 août 1976

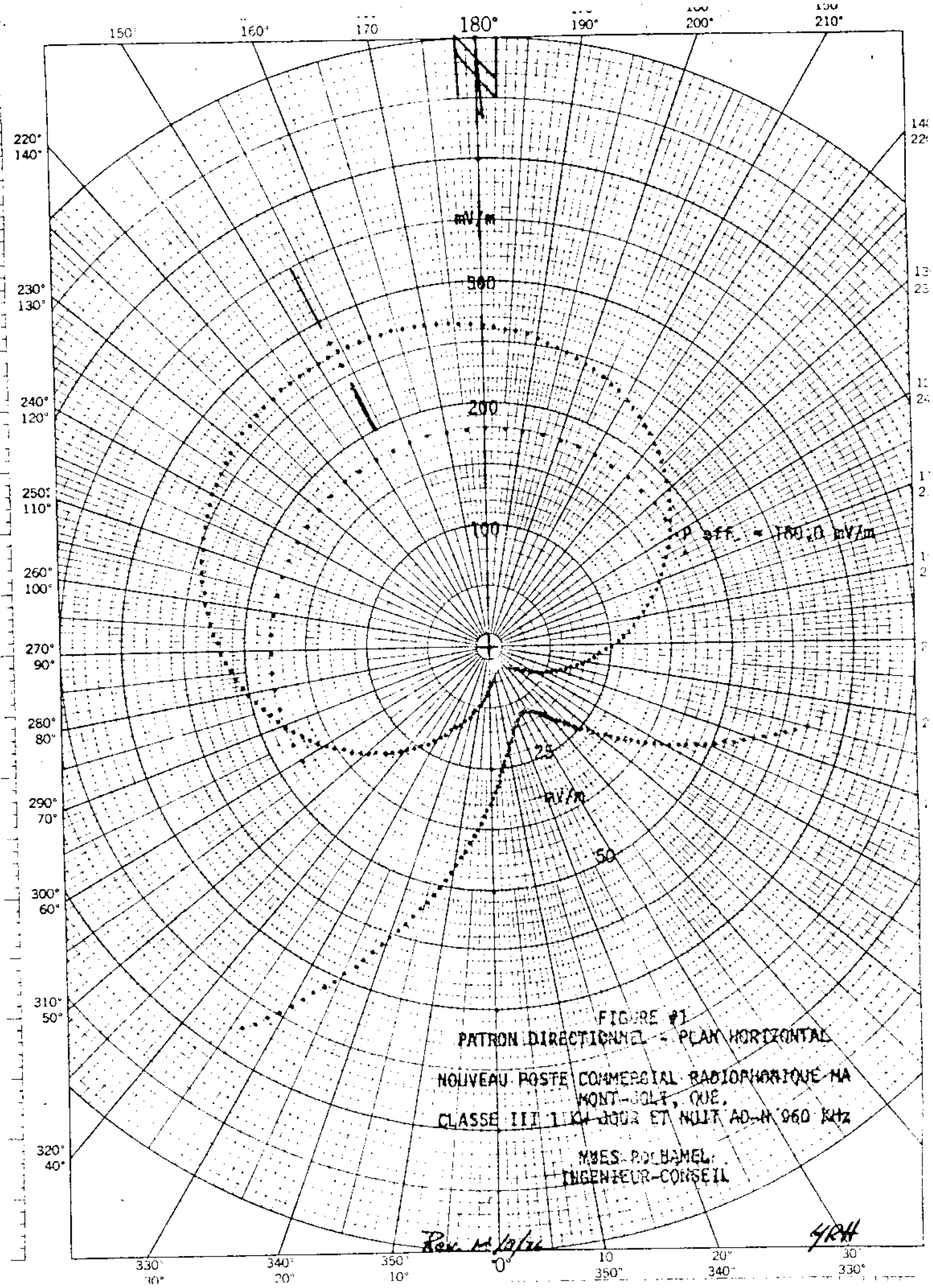


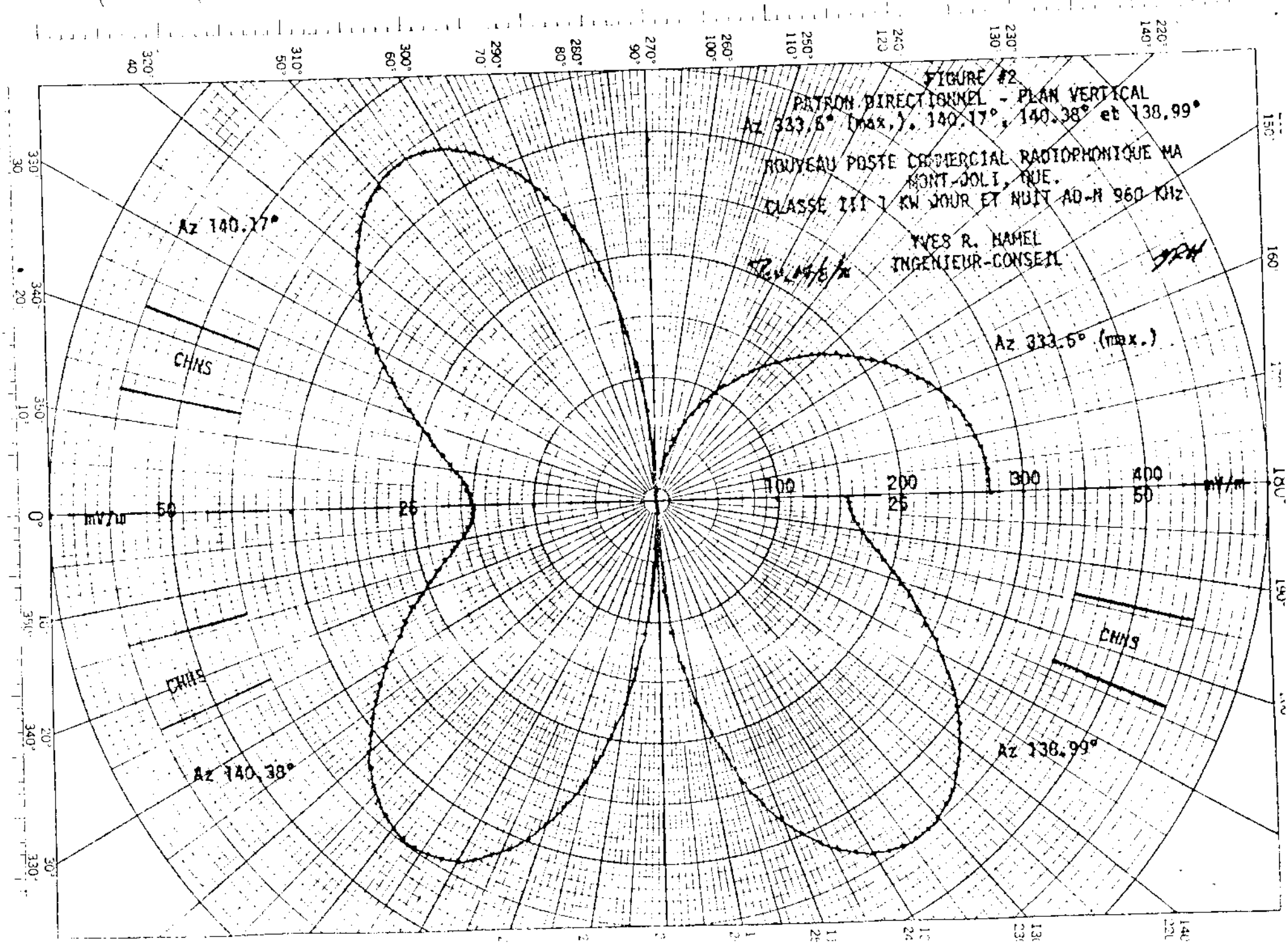
FIGURE #1
PATRON DIRECTIONNEL - PLAN HORIZONTAL

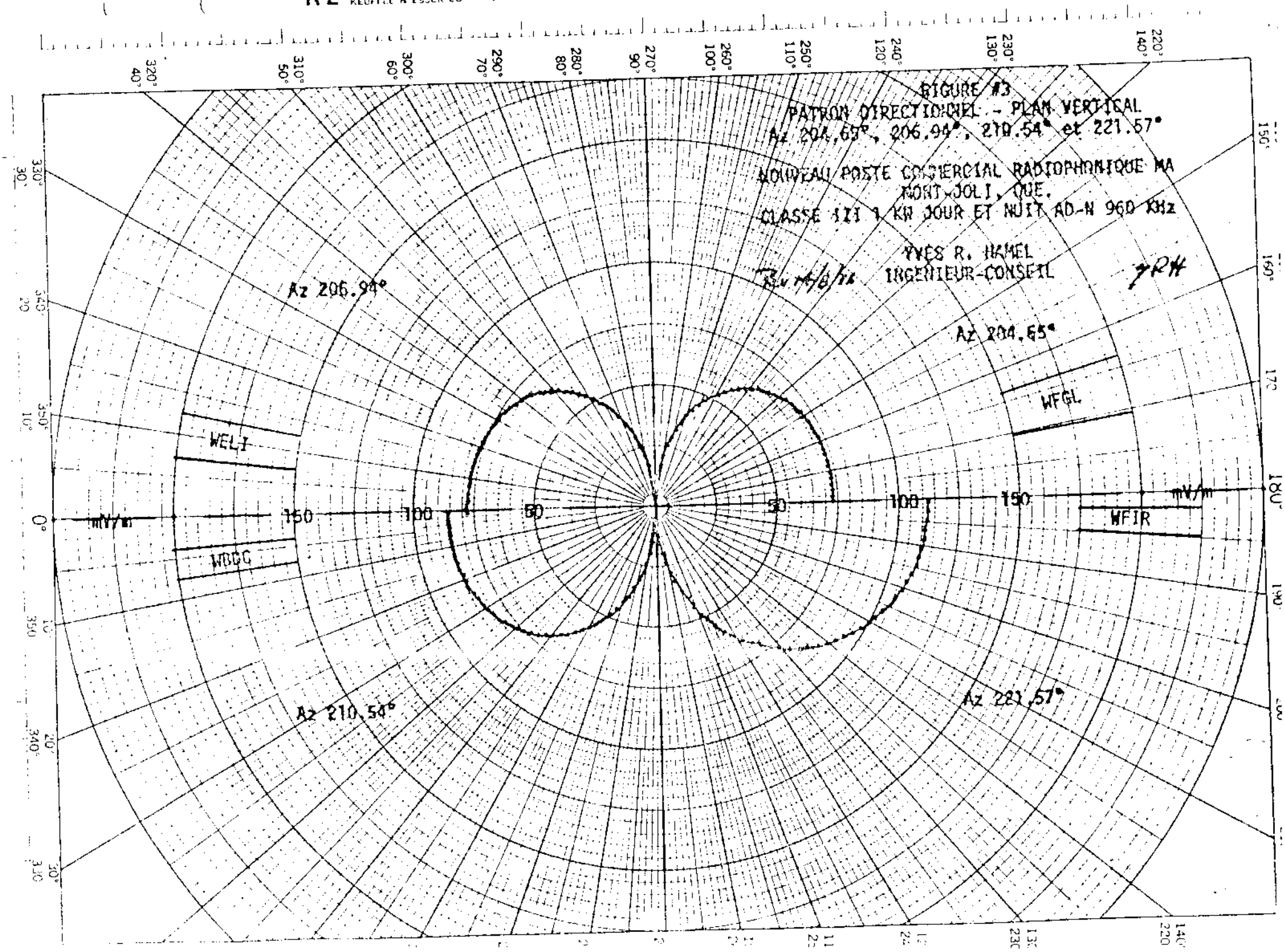
NOUVEAU POSTE COMMERCIAL RADIOPHONIQUE MA
MONT-JOLY, QUE.
CLASSE III 1 KW JOUR ET NUIT AD-H 960 KHz

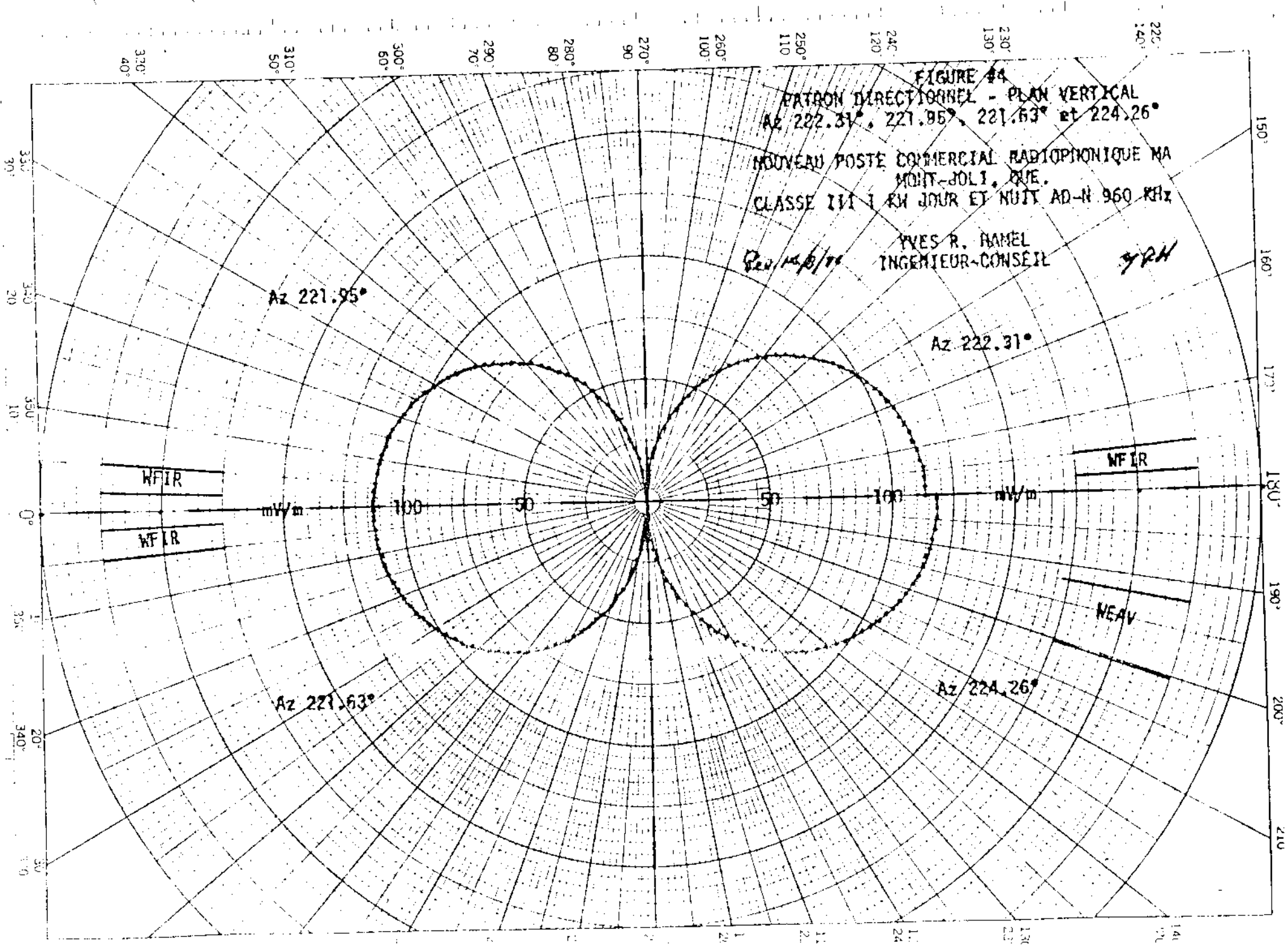
MRES-ROLHAMEL
INGENIEUR-CONSEIL

Rev. 10/72

4RH


K+E POLAR CO-ORDINATE
46 4412
FIGURE #2
PATRON DIRECTIONNEL - PLAN VERTICAL
Az 333.6° (max.), 140.17°, 140.38° et 138.99°
NOUVEAU POSTE COMMERCIAL RADIOPHONIQUE MA
MONT-JOLI, QUE.
CLASSE III 1 KW JOUR ET NUIT AD-N 960 KHz
YVES R. HAMEL
INGENIEUR-CONSEIL
Az 140.17°
Az 333.6° (max.)
Az 140.38°
Az 138.99°
CHNS
CHNS
CHNS
mV/m
mV/m
100
200
300
400
50
25
50
25
0°


K+E POLAR CO-ORDINATE
KEUFFEL & ESSER CO.
FIGURE #3
PATRON DIRECTIONNEL - PLAN VERTICAL
Az 204.65°, 206.94°, 210.54° et 221.57°
NOUVEAU POSTE COMMERCIAL RADIOPHONIQUE MA
MONT-JOLI, QUE.
CLASSE III 1 KW JOUR ET NUIT AD-N 960 KHz
YVES R. HAMEL
INGENIEUR-CONSEIL
Az 206.94°
Az 204.65°
Az 210.54°
Az 221.57°
WELI
WDCG
WFGL
WFIR
mV/m
150
100
50
0°
180°


K+E POLAR CO-ORDINATE
FIGURE #4
PATRON DIRECTIONNEL - PLAN VERTICAL
Az 222.31°, 221.95°, 221.63° et 224.26°
NOUVEAU POSTE COMMERCIAL RADIOPHONIQUE MA
MONT-JOLI, QUE.
CLASSE III 1 KW JOUR ET NUIT AD-N 960 KHz
YVES R. HAMEL
INGENIEUR-CONSEIL
Az 221.95°
Az 222.31°
Az 221.63°
Az 224.26°
WFIR
WFIR
WFIR
WEAV
mV/m
100
50
50
100
mV/m
0°
180°

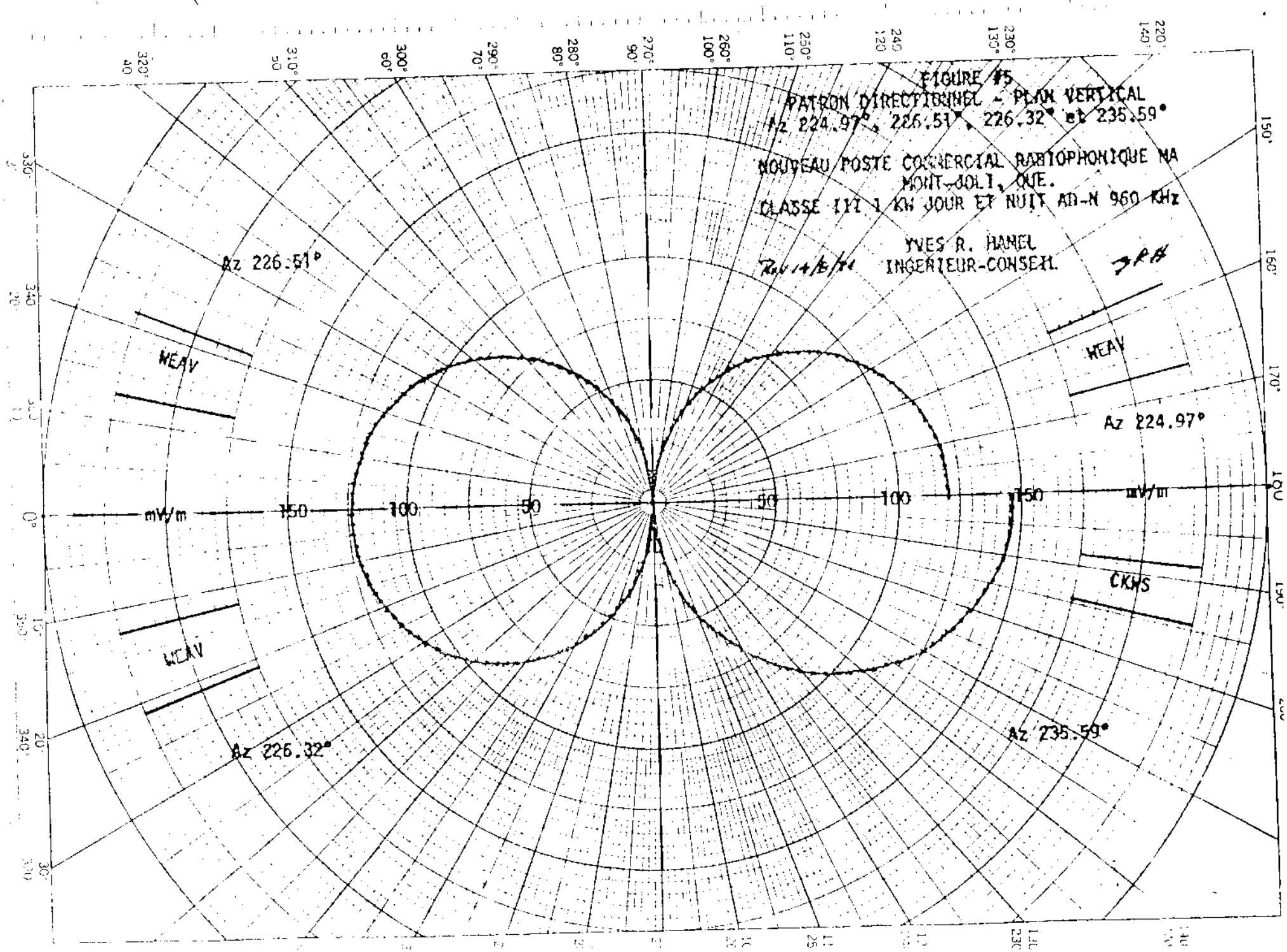


FIGURE #5
PATRON DIRECTIONNEL - PLAN VERTICAL
Az 224.97°, 226.51°, 226.32° et 235.59°
NOUVEAU POSTE COMMERCIAL RADIOPHONIQUE MA
MONT-JOLI, QUE.
CLASSE III 1 KW JOUR ET NUIT AD-N 960 KHz
YVES R. HANEL
INGENIEUR-CONSEIL
Az 226.51°
WEAV
Az 224.97°
WEAV
mV/m
150
100
50
50
100
150
mV/m
CKMS
WEAV
Az 226.32°
Az 235.59°

Directional Antenna Description Sheet

Station : CFAC Main Studio : Calgary, Alberta

Frequency : 960 kc Power : 50 kw Class : III

Notification List No. : 265 Date : January 21, 1970

Geographical Location
of Antenna System : N. Lat. 50° 59' 21" W. Lng. 113° 50' 20"

Antenna Characteristics : Mode of Operation : DA-N
Number of Elements : 3
Type of Element : guyed, uniform cross-section, no top loading

	North Tower	Centre Tower	South Tower
Height above insulator	257' (90°)	435' (153°)	257'
Overall Height	262'	440'	262'
Spacing	328' (115°) between adjacent towers		
Phasing	85° lag	0°	85° lead
Field Ratio	1.0	2.32	1.0
Orientation	Centre line through towers bears N9°W		
Ground System	Around each tower base 120 radials 415' long, spaced 3°. Also, around Centre Tower base 120 additional radials, each 40' long.		
Predicted Effective Field	1490 mv/m at 1 mile (211 per kw)		

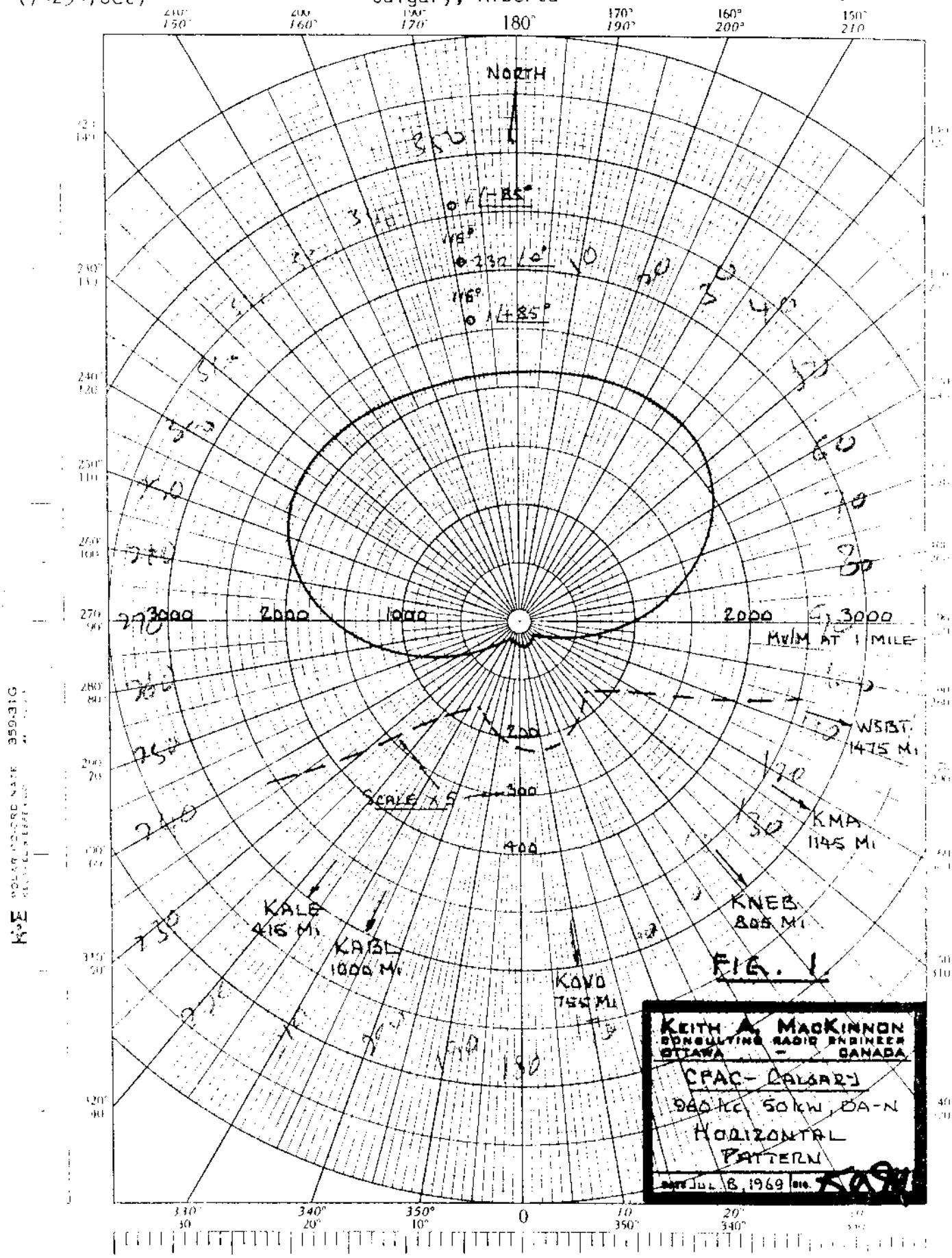
oooooooooooooooo

CFAC

Proposed Night
(7-29-70ct)

Station CFAC
Calgary, Alberta

50kw,DA-N,U,Class III
960 kc



#199

CFAC

Directional Antenna Description Sheet

Station : CFAC Main Studio : Calgary, Alberta

Frequency : 960 kc Power : 50 kw Class : III

Notification List No. : 199 Date : May 10, 1965

Geographical Location of Antenna System : N. Lat. 50° 53' 51", W. Lng. 114° 09' 57"

Antenna Characteristics : Mode of Operation : DA-N
Number of Elements : 3
Type of Element : guyed, uniform cross-section, no top loading

	North Tower	Centre Tower	South Tower
Height above insulator	257' (90°)	435' (153°)	257'
Overall Height	262'	440'	262'
Spacing	328' (115°) between adjacent towers		
Phasing	85° lag	0°	85° lead
Field Ratio	1.0	2.32	1.0
Orientation	Centre line through towers bears N9°W.		
Ground System	Around each tower base, 120 radials, 415' long, spaced 3°.		
Predicted Effective Field :	1490 mv/m at 1 mile (211 per kw)		

oooooooooooooooooooo

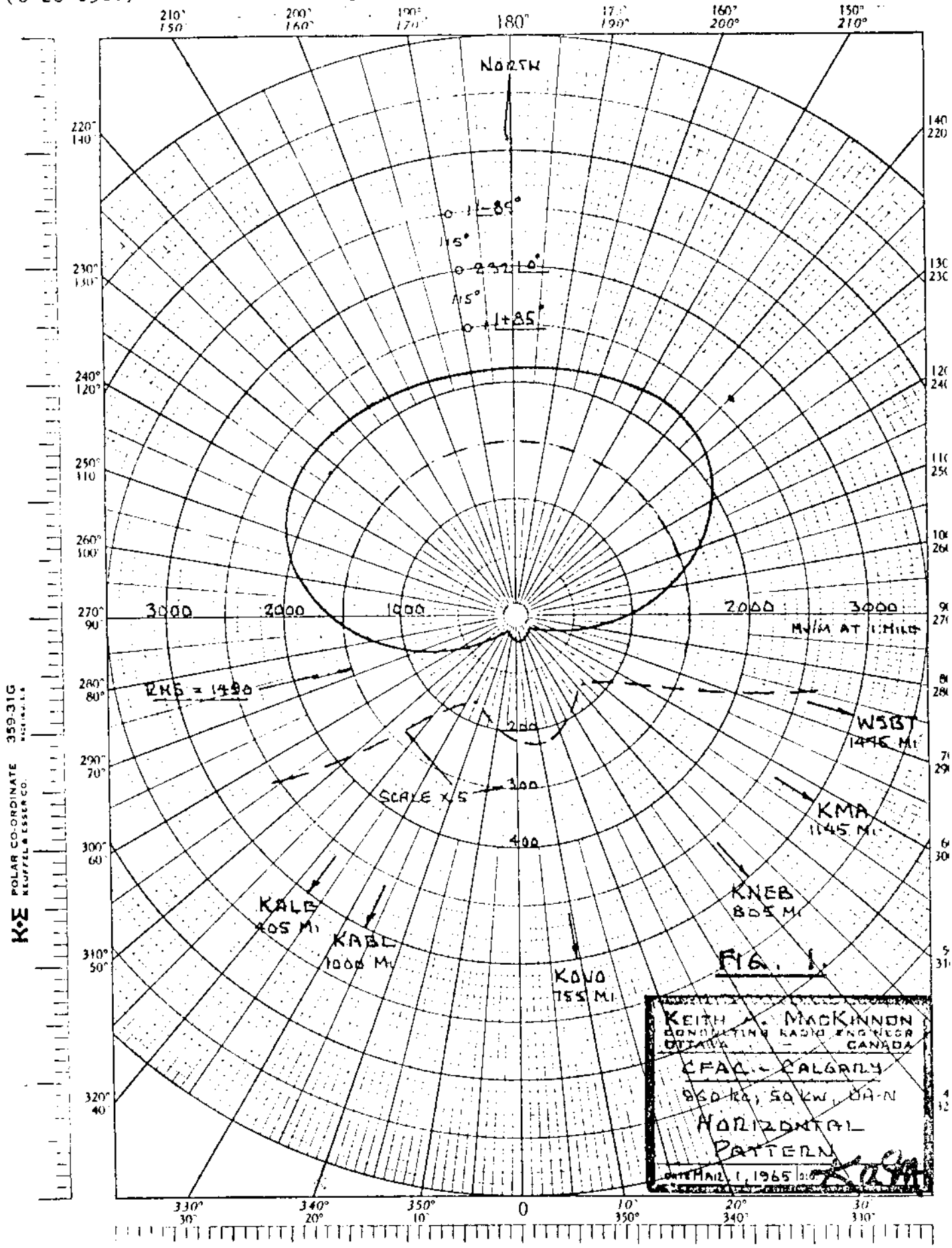
199

CFAC

Proposed Night
(6-28-65ct)

Station CFAC
Calgary, Alberta

50kw, DA-N, U, Class III
960 kc



#123

CFAC

DESCRIPTION SHEET (10-24-58g)	Station CFAC Calgary, Alberta, Canada	10kw, DA-N,U, Class III 960 KC

Station: CFAC

Main Studio: Calgary, Alberta

Frequency: 960 Kcs

Power: 10 Kw Class: III

Notification List No. 123

Date: July 2, 1958

GEOGRAPHICAL LOCATION OF THE ANTENNA SYSTEM:

North Latitude: 50° 56' 52"

West Longitude: 114° 03' 47"

ANTENNA CHARACTERISTICS

Mode of Operation: DA-N
Number of elements: Two
Type of elements: Guyed uniform cross-section. Series-fed, no top loading

	North	South
TOWER:		
HEIGHT ABOVE INSULATORS:	176'	435'
SPACING:	365' (135°)	
PHASING:	75° LAG	0°
FIELD RATIO:	0.70	1.0
ORIENTATION:	Centre line through towers bears N 16° W	
GROUND SYSTEM:	120 radials 500' Long Spaced 3°	120 radials 500' Longspaced 3° plus 120 radials 60' long interspaced

Predicted effective field 650 mv/m (206 for 1 kw)

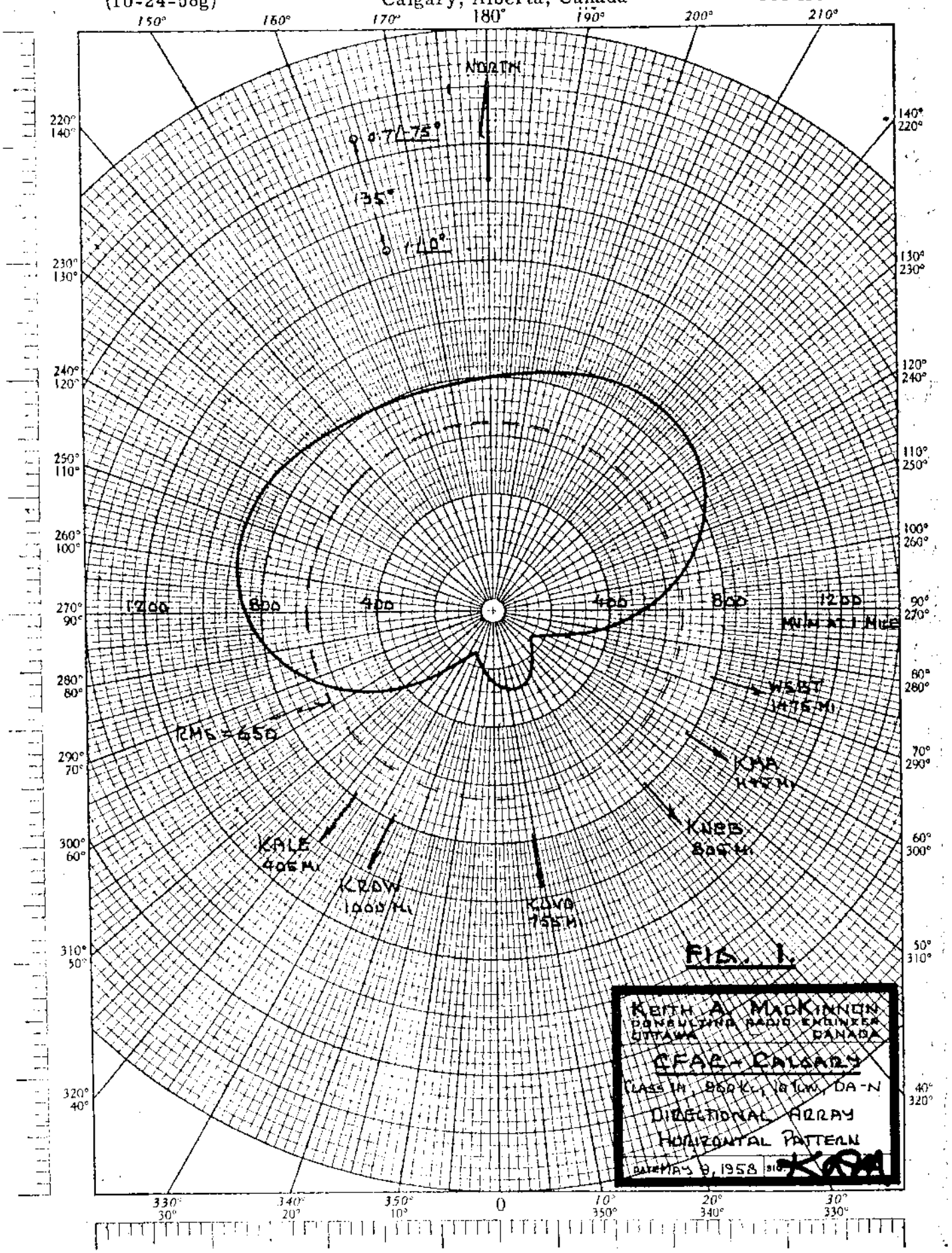
#123

CFAC

PROPOSED NIGHT
(10-24-58g)

Station CFAC
Calgary, Alberta, Canada

10kw, DA-N,U, Class III
960 KC



CFTJ

ANTENNA DESCRIPTION SHEET

DIRECTIONAL DA-1

Station Call:	C F T J
Location:	Cambridge, Ontario.
Frequency:	960 khz
Power:	1000 watts
Class:	III
Time:	Unlimited

Notification Reference: List 384 May 8, 1979

Geographical Coordinates: Lat 43°20'55", Lon 80°14"45"

Array Characteristics: Five elements, guyed, uniform cross section, base insulated, series feed. Height 220 feet, top loaded to effect height of 85 degrees.

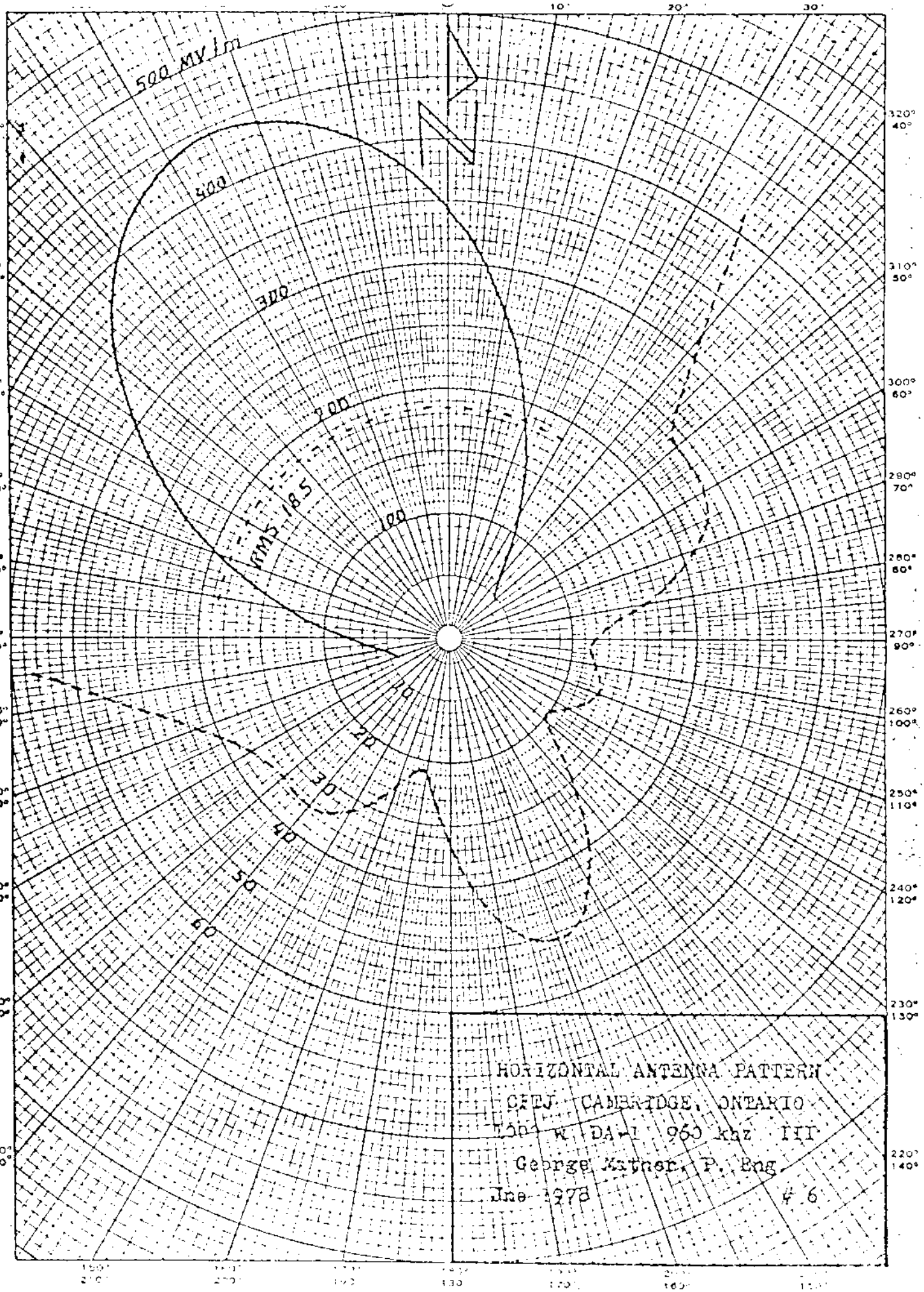
ELEMENT	ONE	TWO	THREE	FOUR	FIVE
Spacing	Ref	197.40° 562.2'	180.00° 512.7'	192.57° 548.5'	75.00° 213.6'
Bearing	Ref	45.68°	68.00°	90.91°	160.00°
Ratio	1.00	---	0.75	0.66	0.88
Phase	00°	---	10°	125°	115°

Ground System: 120 radials per tower, #10 AWG bare, soft copper wire, spaced uniformly, depth 8 inches approximately. Radials bonded along lines between towers and bonded to soft copper straps at tower bases. Maximum radial length 410 feet.

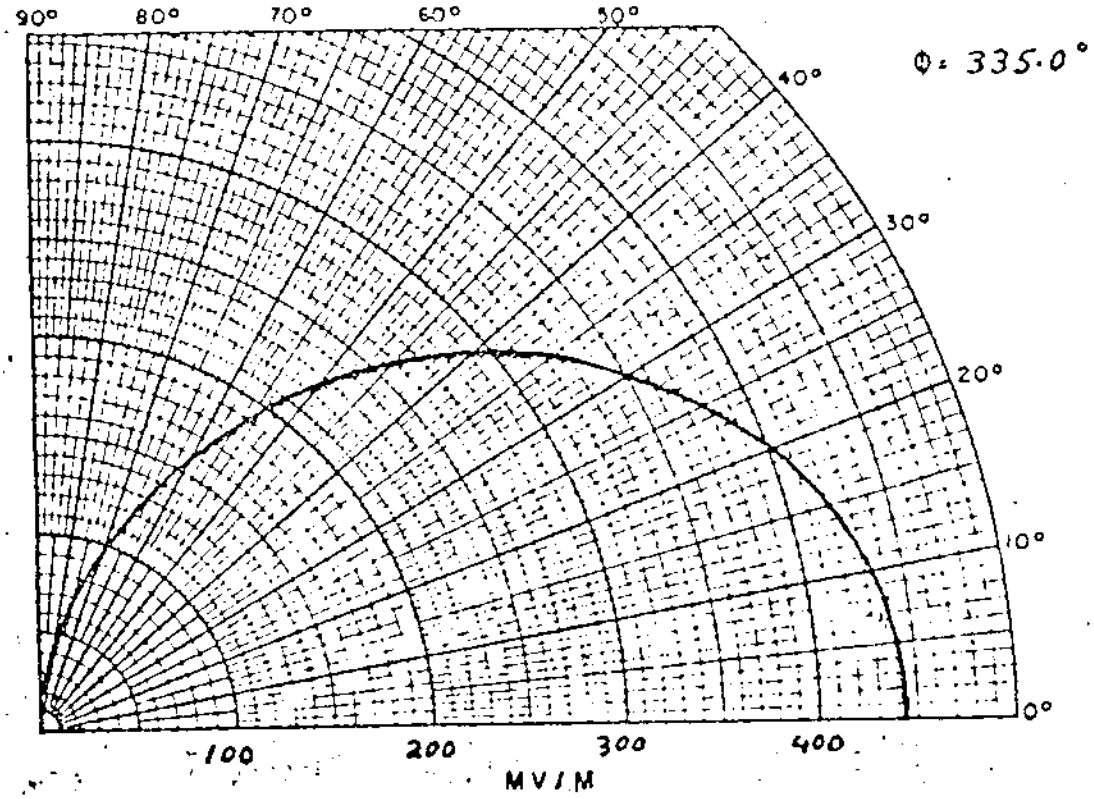
Predicted RMS: 185 mv/m at 1 mile for 1000 watts

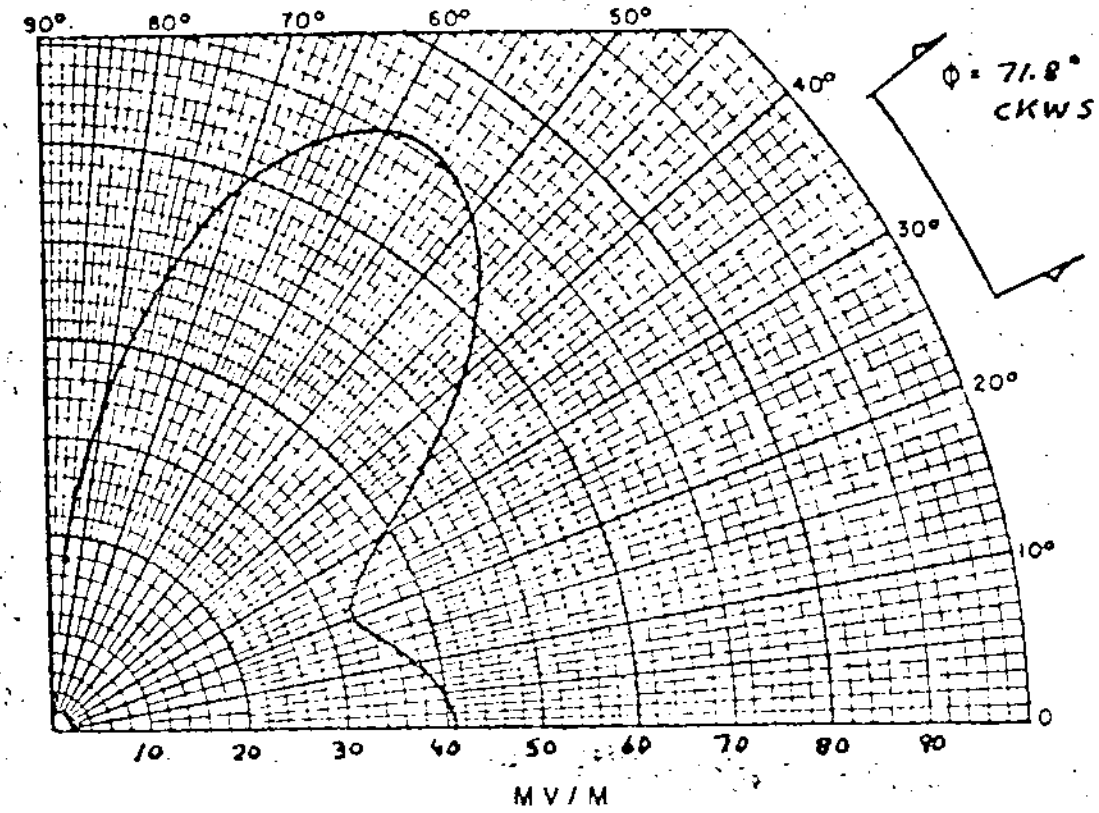
Jne 1978

5



POLAR CO-ORDINATE

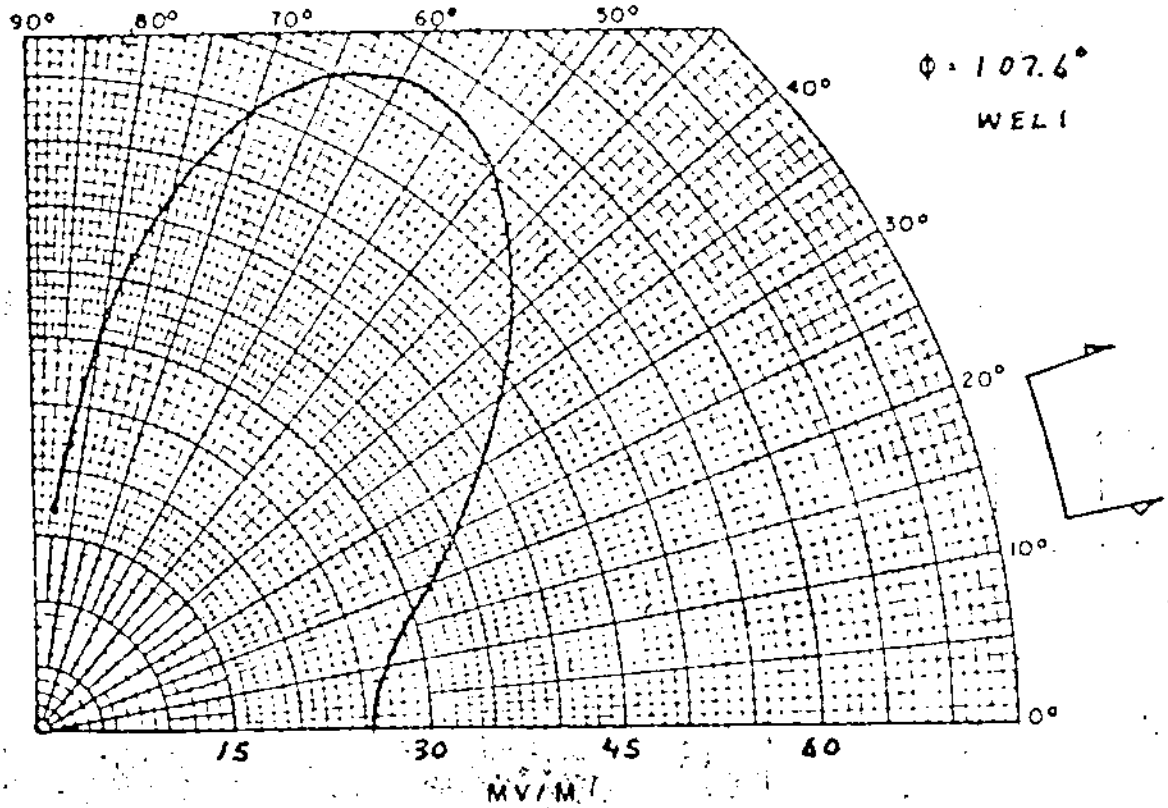


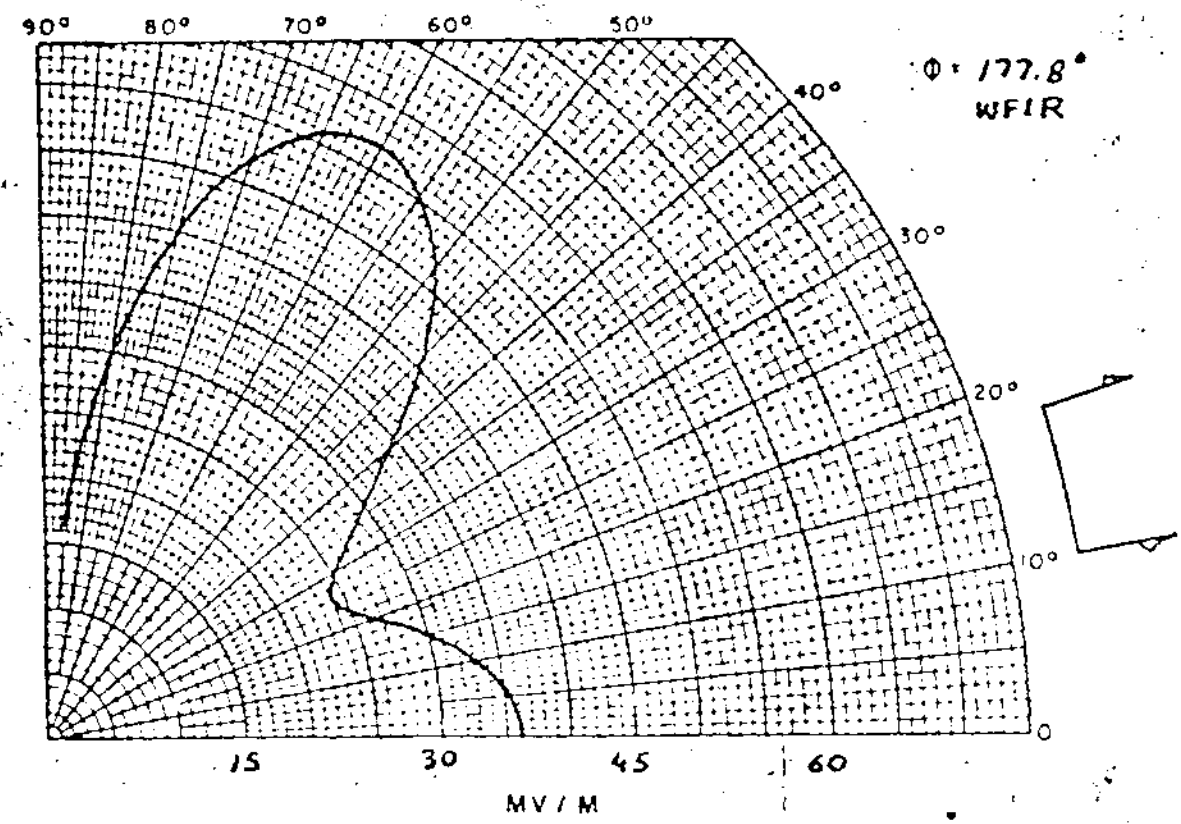


VERTICAL RADIATION PATTERNS

CFTJ CAMBRIDGE, ONTARIO
1000 w DA-1 960 khz III
George Mather, P. Eng.

Jne 1978



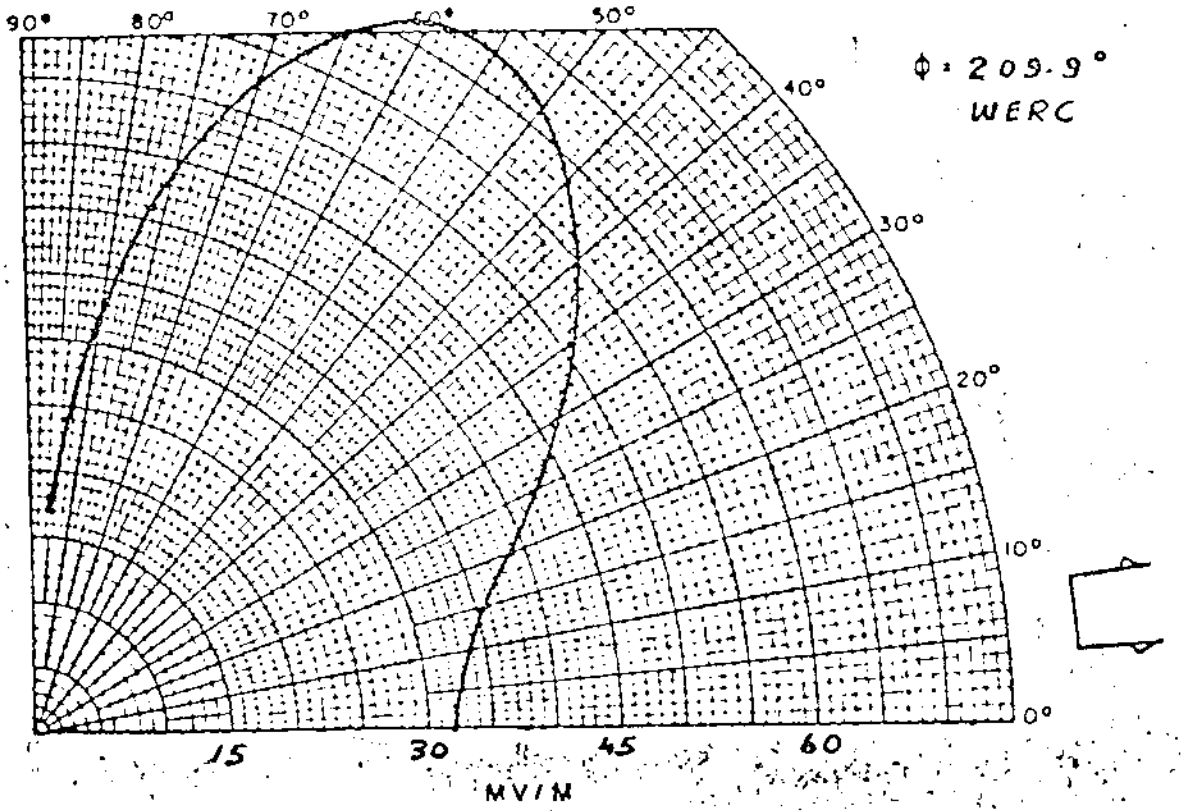


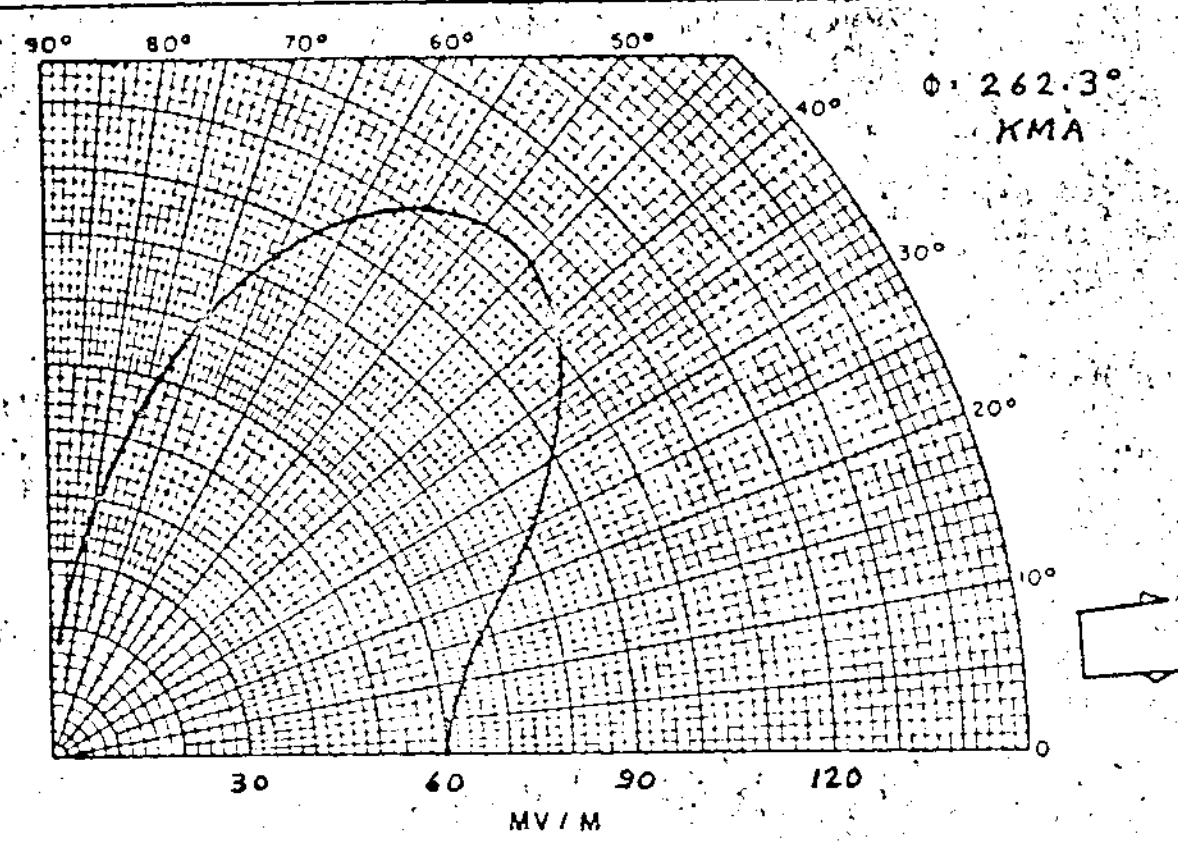
VERTICAL RADIATION PATTERNS

CFTJ CAMBRIDGE, ONTARIO
1000 w DA-1 960 khz III
George Mather, P. Eng.

Jne 1978

POLAR COORDINATE





POLAR CO-ORDINATE

VERTICAL RADIATION PATTERNS

CFTJ CAMBRIDGE, ONTARIO
1000 w DA-1 960 khz III
George Mather, P. Eng.

Jne 1978

TABLE 1

ANTENNA DESCRIPTION SHEET

CFTJ

STATION CALL: CFTJ

MAIN STUDIO: CAMBRIDGE, ONTARIO

FREQUENCY: 960 kHz

POWER: 1 kW

CLASS: III

MODE: DA-2

TIME: UNLIMITED

NOTIFICATION LIST NO.: .351. DATE: Feb. 11/76

GEOGRAPHICAL LOCATION: Latitude: 43° 20' 55" North
Longitude: 80° 14' 45" West

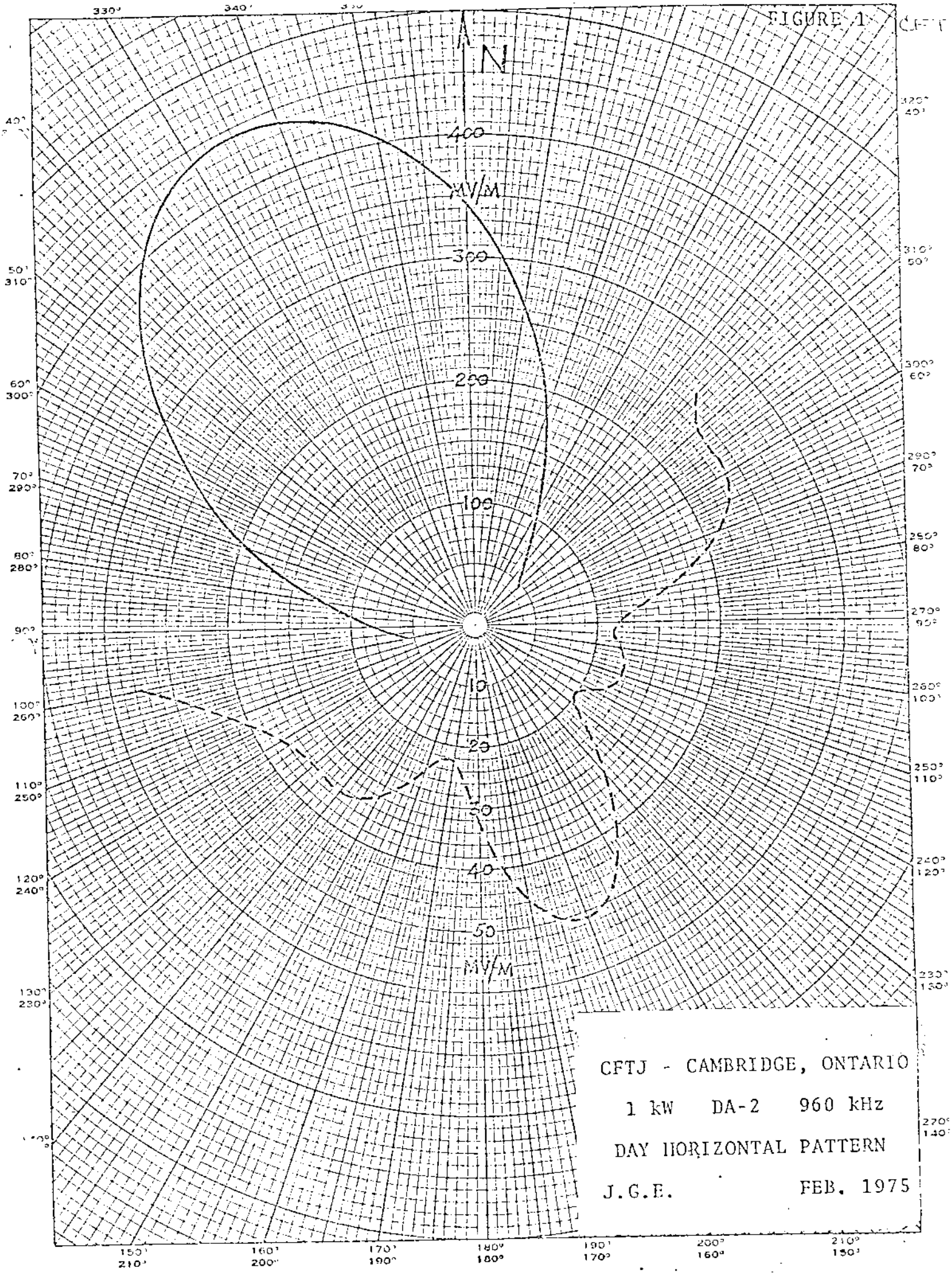
ARRAY CHARACTERISTICS: Five guyed steel towers of uniform cross section; base insulated series fed; top loaded using the upper guy wires for an effective height of approximately 85°.

TOWER NUMBER:	1 NW	2 NE	3 CE	4 SE	5 SW
HEIGHT ABOVE INSULATOR:	220'	220'	220'	220'	220'(77.3°)
DAY FIELD RATIO:	1.00	-	0.75	0.66	0.88
DAY PHASE ANGLE:	0°	-	10°	125°	115°
NIGHT FIELD RATIO:	1.00	1.00	1.00	-	1.00
NIGHT PHASE ANGLE:	0°	352°	117°	-	125°
SPACING:	ref.	198.47° 561.7'	180.0° 512.2'	192.57° 548.0'	75.0° 213.4'
ORIENTATION:	ref.	045.73°	068°	090.91°	160°

GROUND SYSTEM: 120 equally spaced copper radial wires per tower, buried 6"-12", of average length 410'(0.4λ), excluding those along the common chords.

PREDICTED EFFICIENCY: 185 mV/m at one mile for 1 kW day and night.

FIGURE 1


N
400
MV/M
300
200
100
10
20
30
40
50
MV/M
CFTJ - CAMBRIDGE, ONTARIO
1 kW DA-2 960 kHz
DAY HORIZONTAL PATTERN
J.G.E. FEB. 1975

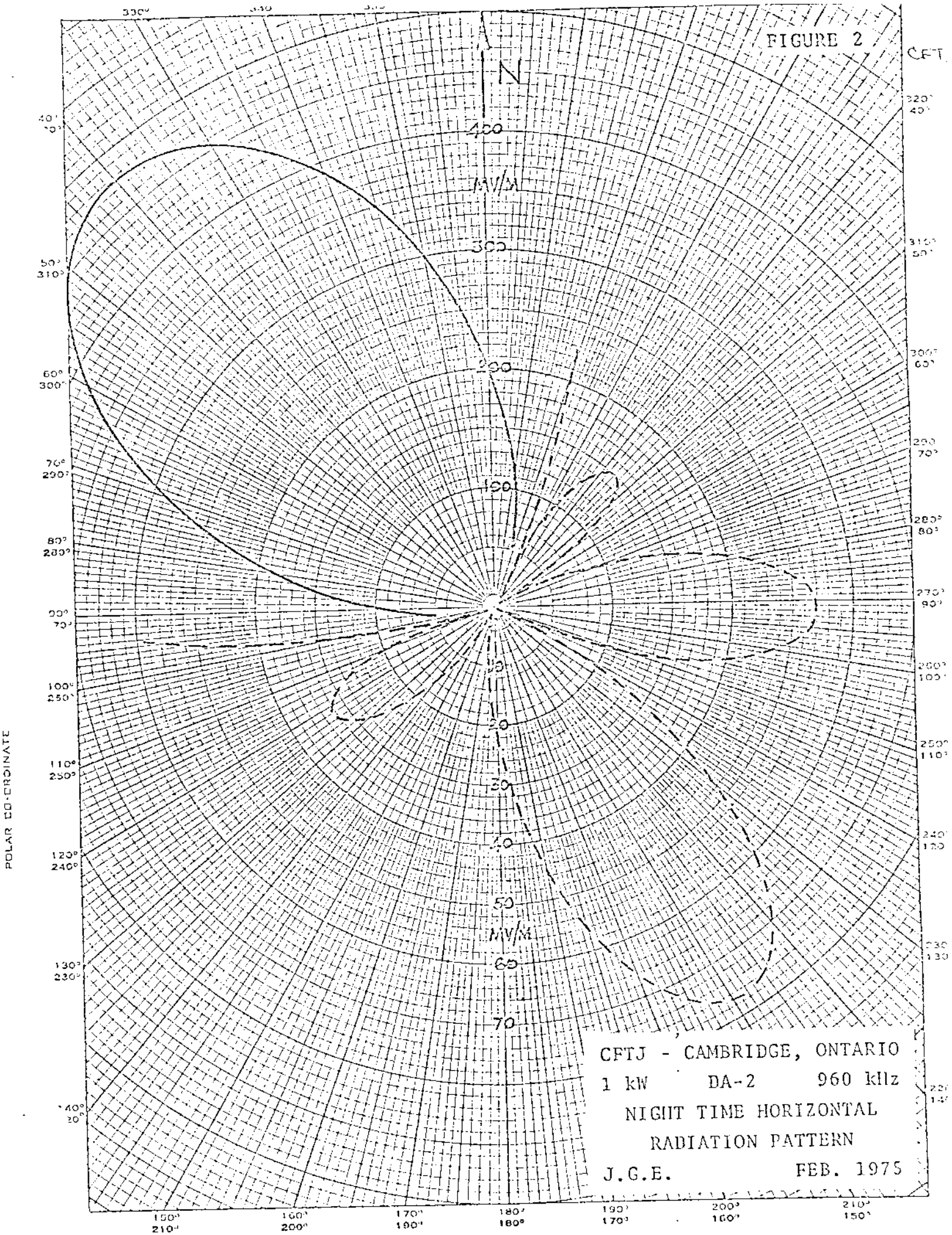
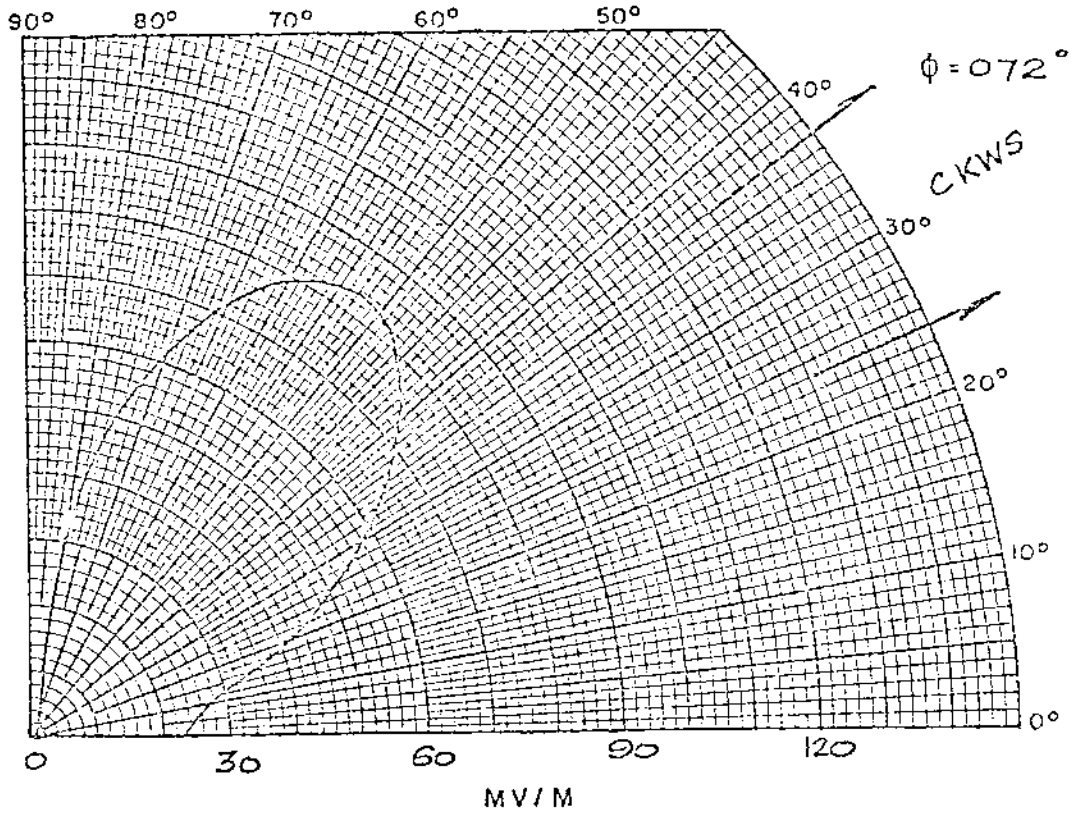
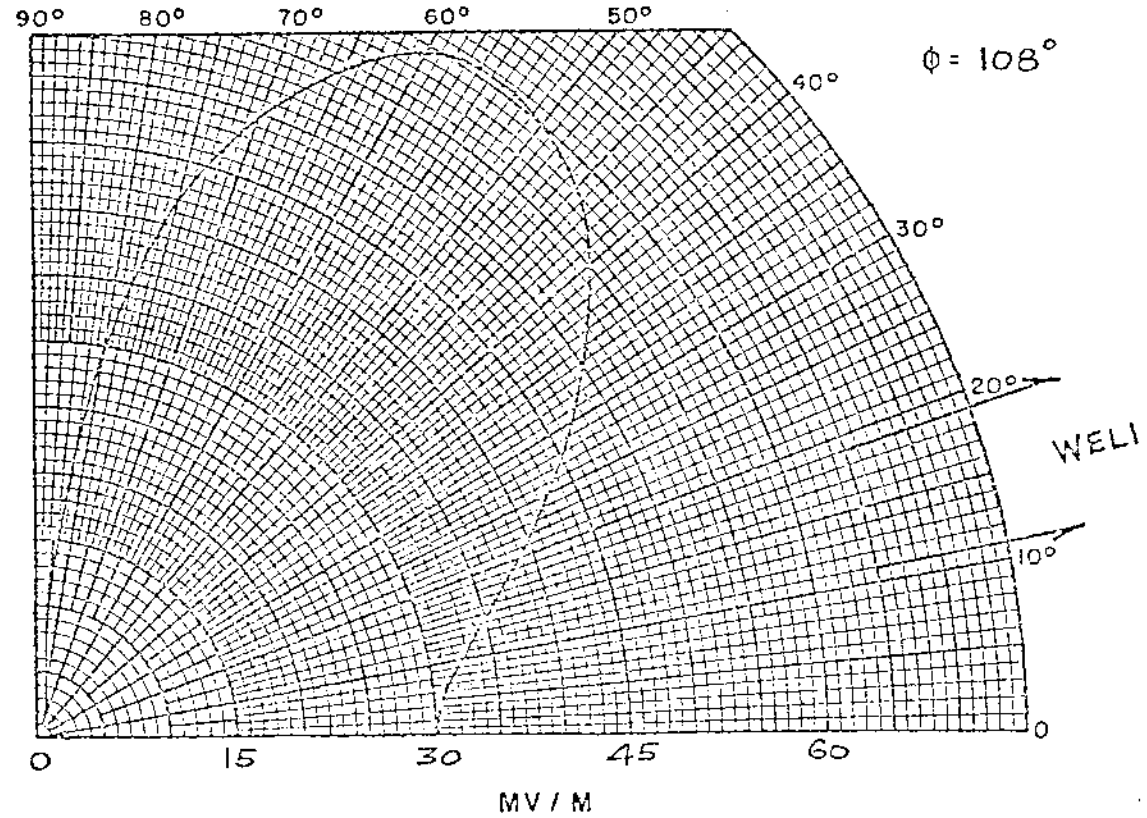


FIGURE 2
CFT
N
400
MV/M
300
200
100
20
30
40
50
MV/M
60
70
POLAR CO-ORDINATE
CFTJ - CAMBRIDGE, ONTARIO
1 kW DA-2 960 kHz
NIGHT TIME HORIZONTAL
RADIATION PATTERN
J.G.E. FEB. 1975



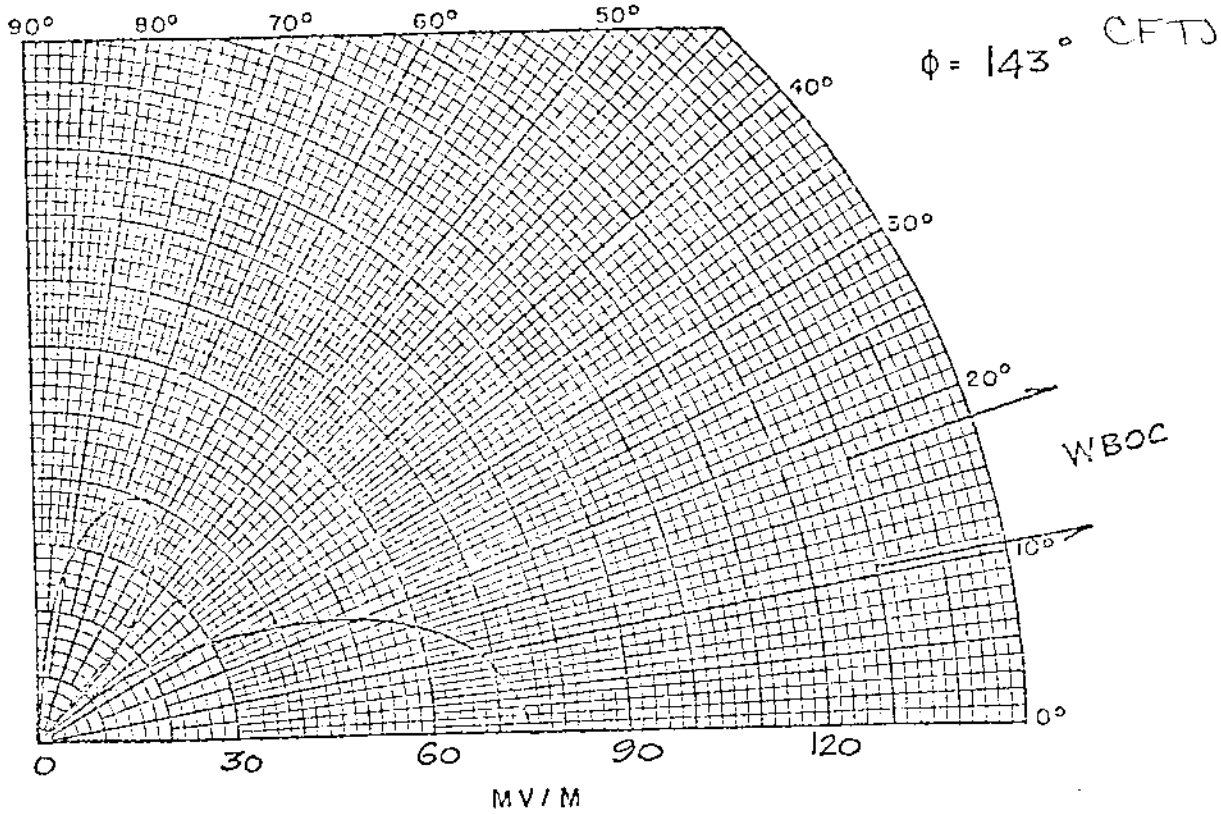


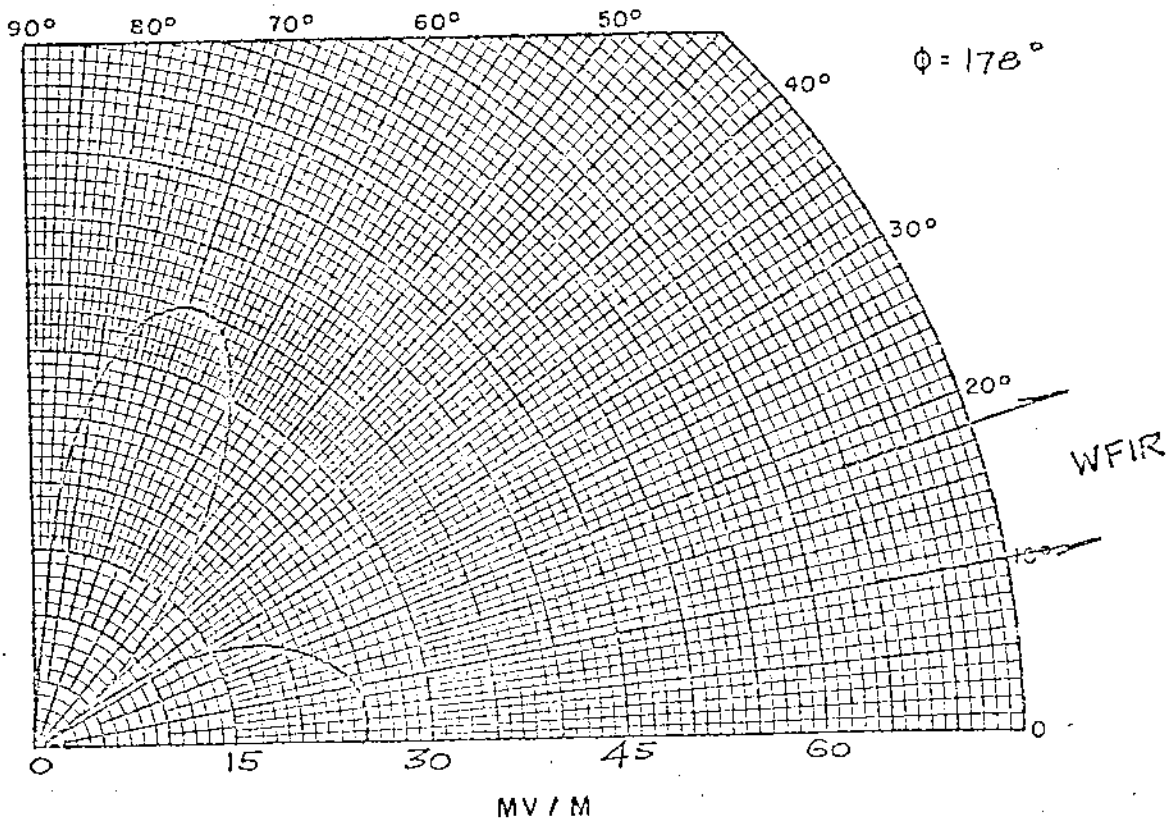
VERTICAL RADIATION PATTERNS

CFTJ - CAMBRIDGE, ONTARIO

1 kW DA-2 960 kHz

J.G.E. MARCH 1973



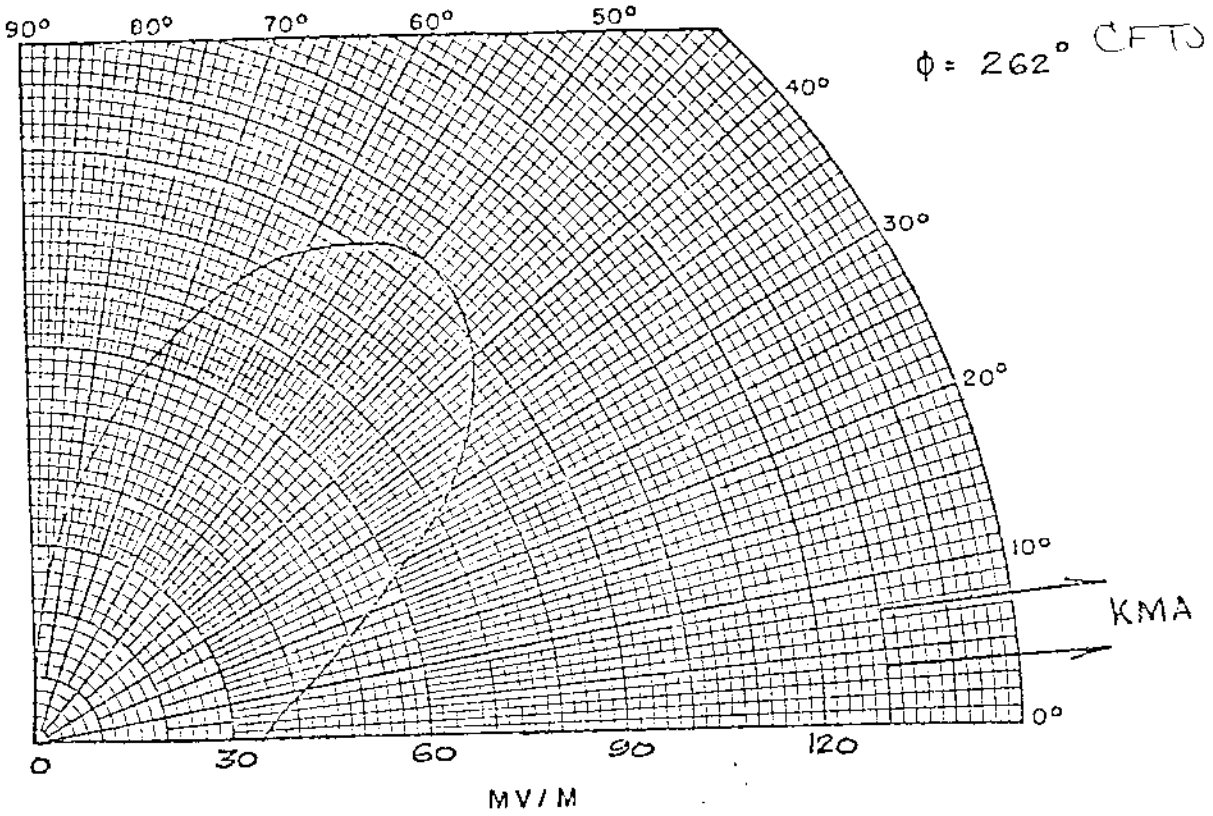


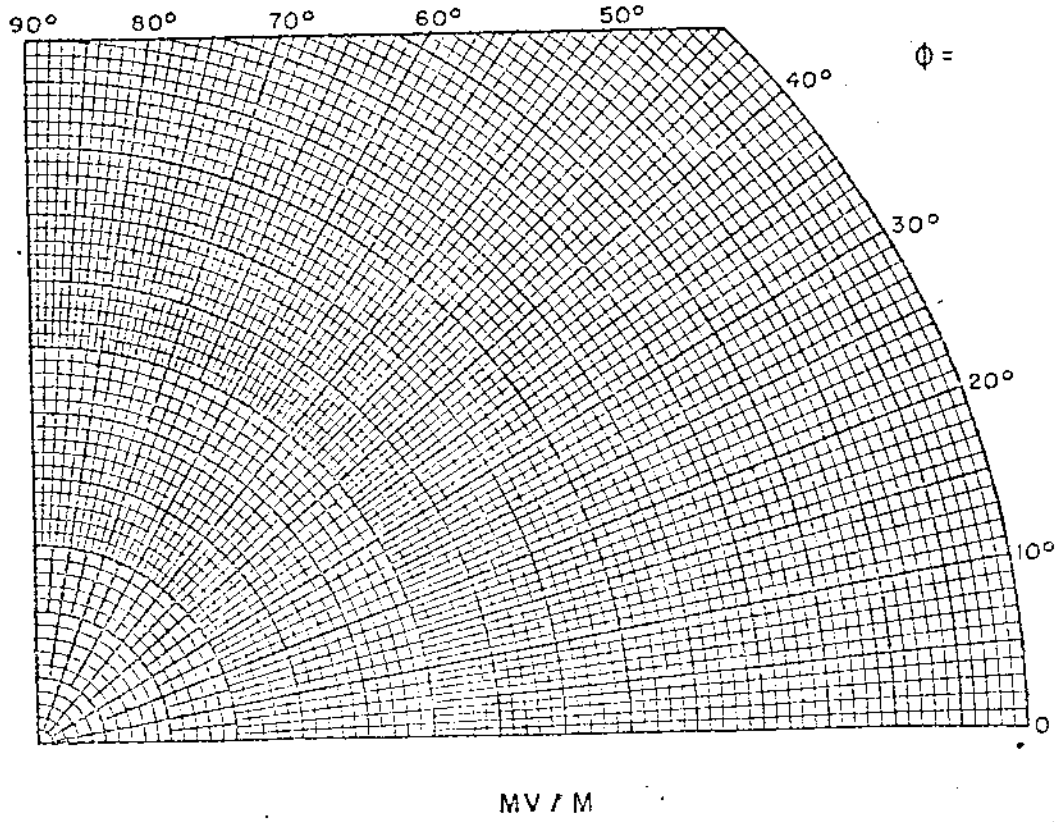
VERTICAL RADIATION PATTERNS

CFTJ - CAMBRIDGE, ONTARIO

1 kW DA-2 960 kHz

J.G.E. MARCH 1973





VERTICAL RADIATION PATTERNS

CFTJ - CAMBRIDGE, ONTARIO

1 kW DA-2 960 kHz

J.G.E. MARCH 1973

#123

CHNS

DESCRIPTION SHEET
(10-24-58g)

Station CHNS
Halifax, Nova Scotia

10kw, DA-N,U, Class III
960 KC

Station: CHNS

Main Studio: Halifax, Nova Scotia

Frequency: 960 Kcs

Power: 10 Kw Class: III

Notification List No. 123

Date: July 2, 1958

GEOGRAPHIC LOCATION OF ANTENNA SYSTEM:

North Latitude: 44° 40' 49"

West Longitude: 63° 39' 35"

ANTENNA CHARACTERISTICS

Mode of Operation: DA-N
Number of elements: Two
Type of elements: Base Insulated, Series-fed.

TOWER:	#1 South West	#2 North East
HEIGHT ABOVE INSULATORS:	224' (78°)	224' (78°)
OVERALL HEIGHT:	229'	229'
SPACING:	415' (145°)	
PHASING:	0	314°
FIELD RATIO:	1.0	1.2

ORIENTATION: On line bearing 060° true

GROUND SYSTEM: 120 radials 410' Long (0.4 wavelengths) spaced 3° about each tower. 120 radials 35' Long interspaced

Predicted effective field	Night	563	mv/m	(178 mv/m for 1 kw)
	Day	585	mv/m	(185 mv/m for 1 kw)

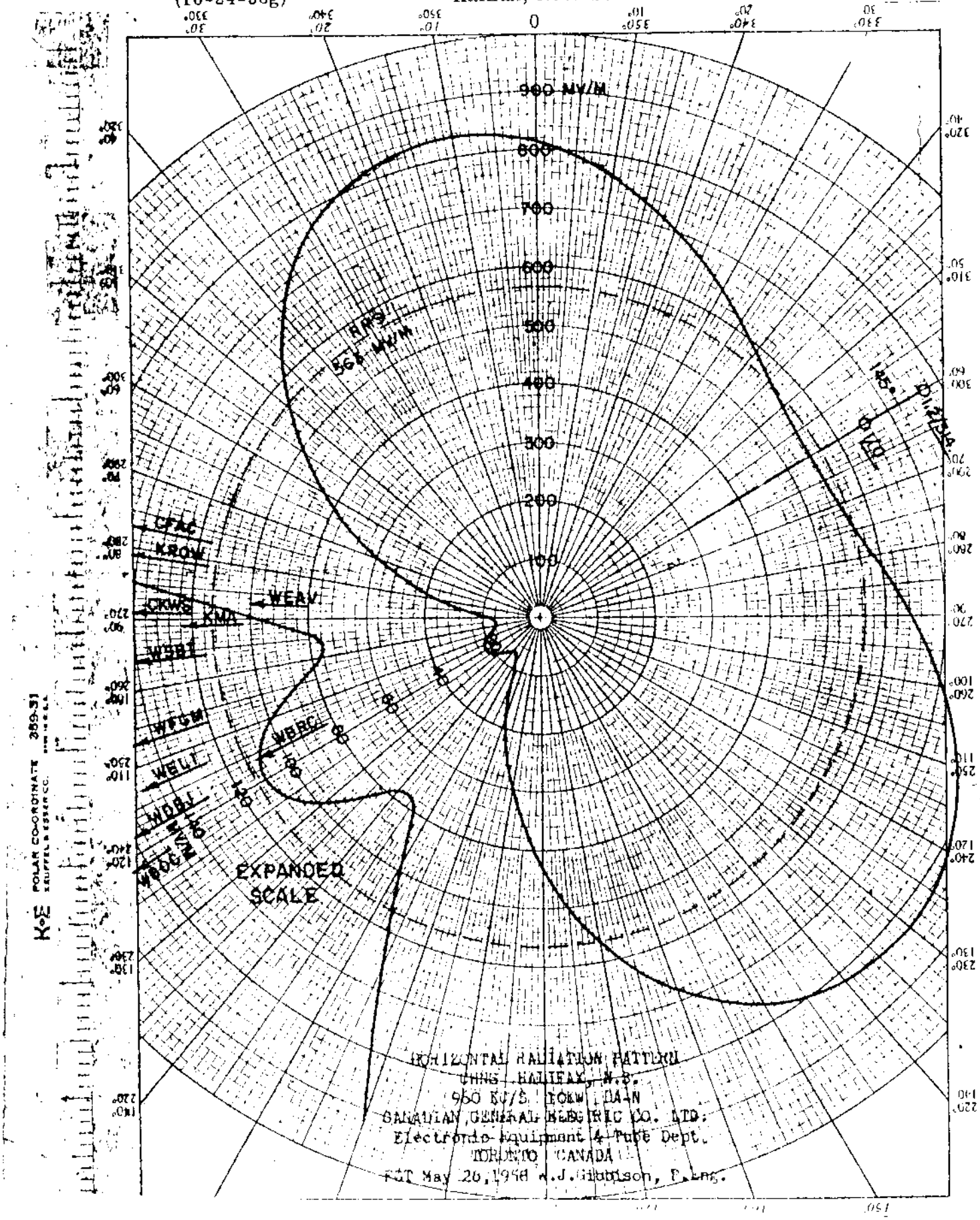
CHNS

#123

PROPOSED NIGHT
(10-24-58g)

Station CHNS
Halifax, Nova Scotia

10kw, DA-N,U, Class III
960 KC



HORIZONTAL RADIATION PATTERN
CHNS HALIFAX, N.S.
960 KC/S 10KW DA-N
CANADIAN GENERAL ELECTRIC CO. LTD.
Electronic Equipment & Tube Dept.
TORONTO CANADA
FCT May 26, 1958 A.J. Gibbison, P.Eng.

CKWS

Description Sheet
(6-27-69ct)

Station CKWS
Kingston, Ontario

5kw,10kw-LS,DA-2,U,Class III
960 kc

CORRECTED DATA
ANTENNA DESCRIPTION SHEET

DIRECTIONAL DA-2

STATION CALL	C K W S
MAIN STUDIO	Kingston, Ontario
FREQUENCY	960 kc/s
POWER	Day 10 kw, 5 kw Night
CLASS	III
TIME	Unlimited
NOTIFICATION REFERENCE	...206... Date: December 14, 1965
GEOGRAPHICAL LOCATION	Lat 44° 10' 51", Lon 76° 27' 49"
ARRAY CHARACTERISTICS	Four elements, guyed, uniform cross section, base insulated, series feed. Height 175 ft or 61.5 degrees. No top loading.

ELEMENT	ONE	TWO	THREE	FOUR	FIVE	SIX
Bearing	Ref	307°	335° 51'	356°	347°	348.983°
Spacing	Ref	122° 347.5'	267.35° 761.4'	171° 487.0'	100.064° 285'	293.92° 837.141'
Day ratio	1.000	0.8200	0.6724	0.8200	not used	not used
Night ratio	1.000	not used	not used	not used	0.95238	0.52381
Day phase	00°	-97°	-154°	-57°	not used	not used
Night phase	00°	not used	not used	not used	238°	116°

Ground System 120 radials per tower, #10 AWG bare, soft copper wire, spaced uniformly, depth 8 inches approximately. Radials bonded on a line between towers and bonded to soft copper strap at tower base. Maximum radial length 410 feet.

Day R M S 556 mv/m at one mile for ten kilowatts
176 mv/m at one mile for one kilowatt

Night R M S 391 mv/m at one mile for five kilowatts
175 mv/m at one mile for one kilowatt

NOTE: Correction relative to night-time pattern parameters necessitated by change of reference tower.

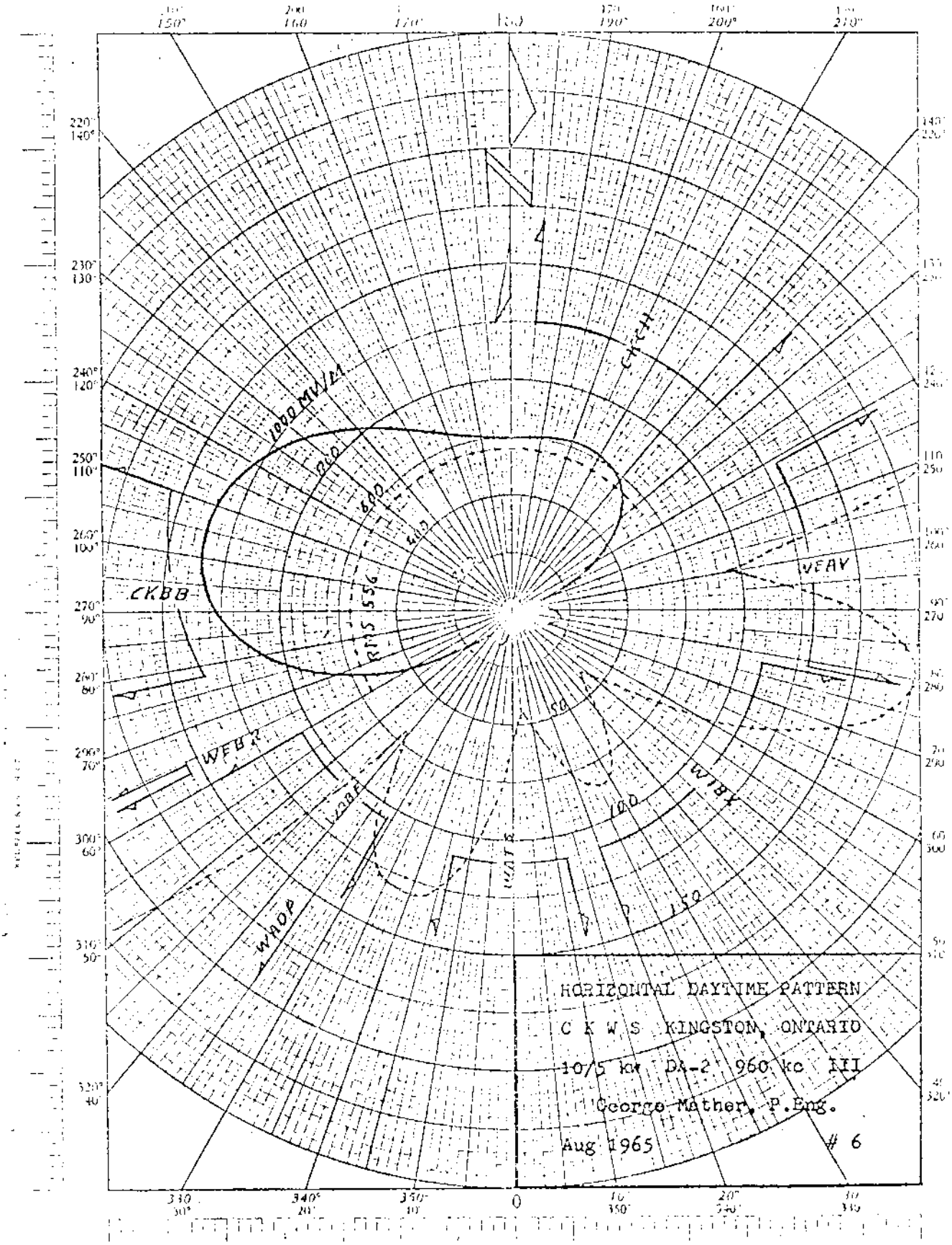
May 1969.

CKWS

Proposed Day
(6-27-69ct)

Station CKWS
Kingston, Ontario

5kw,10kw-LS,DA-2,U,Class III
960 kc



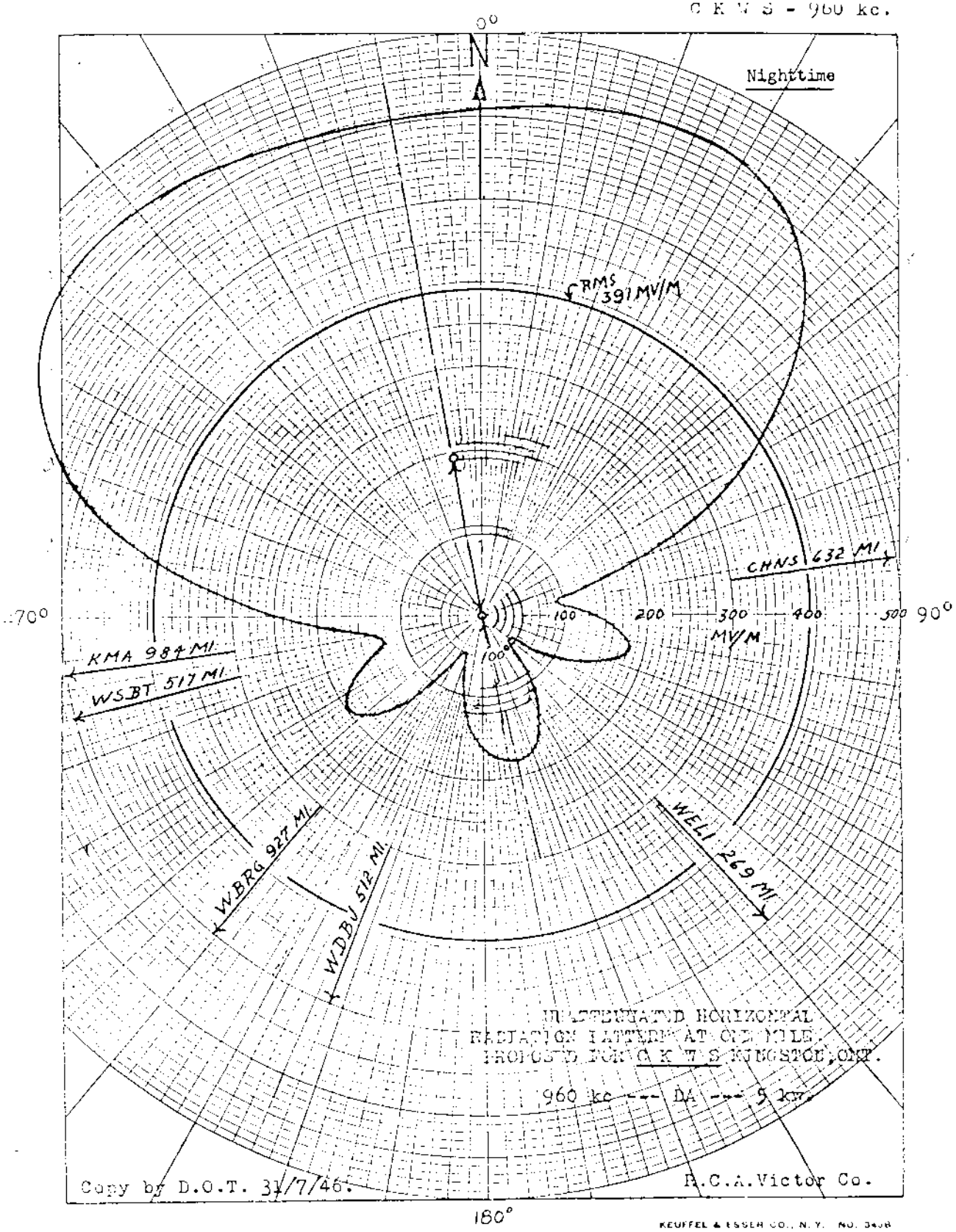
CKWS

Proposed Night
(6-27-69ct)

Station CKWS
Kingston, Ontario

5kw,10kw-LS,DA-2,U,Class III
960 kc

C K W S - 960 kc.



UNATTENUATED HORIZONTAL
RADIATION PATTERN AT ONE MILE
PROPOSED FOR C K W S KINGSTON, ONT.

960 kc --- DA --- 5 kw.

Copy by D.O.T. 31/7/46.

R.C.A.Victor Co.

KEUFFEL & ESSER CO., N.Y. NO. 3408
POLAR CO ORDINATE
MADE IN U.S.A.

#206

CKWS

ANTENNA DESCRIPTION SHEET

DIRECTIONAL DA-2

STATION CALL	C K W S
MAIN STUDIO	Kingston, Ontario
FREQUENCY	960 kc/s
POWER	Day 10 kw, 5 kw Night
CLASS	III
TIME	Unlimited
NOTIFICATION REFERENCE	206 Date: December 14, 1965
GEOGRAPHICAL LOCATION	Lat 44°10'51", Lon 76°27'49"
ARRAY CHARACTERISTICS	Four elements, guyed, uniform cross section, base insulated, series feed. Height 175 ft or 61.5 degrees. No top loading.

ELEMENT	ONE	TWO	THREE	FOUR
Bearing	ref	307°	335°51'	356°
Spacing	ref	122° 347.5'	267.35° 761.4'	171° 487.0'
Day ratio	1.0000	0.8200	0.6724	0.8200
Day phase	00°	-97°	-154°	-57°

Ground System: 120 radials per tower, #10 AWG bare, soft copper wire, spaced uniformly, depth 8 inches approximately. Radials bonded on a line between towers and bonded to soft copper strap at tower base. Maximum radial length 410 feet.

Day R M S: 556 mv/m at one mile for ten kilowatts
176 mv/m at one mile for one kilowatt

NOTE: Please retain daytime pattern notified for CKWS Kingston in Canadian Change List No. 206 dated December 14, 1965 and attach to this description sheet and nighttime pattern.

December 23, 1965

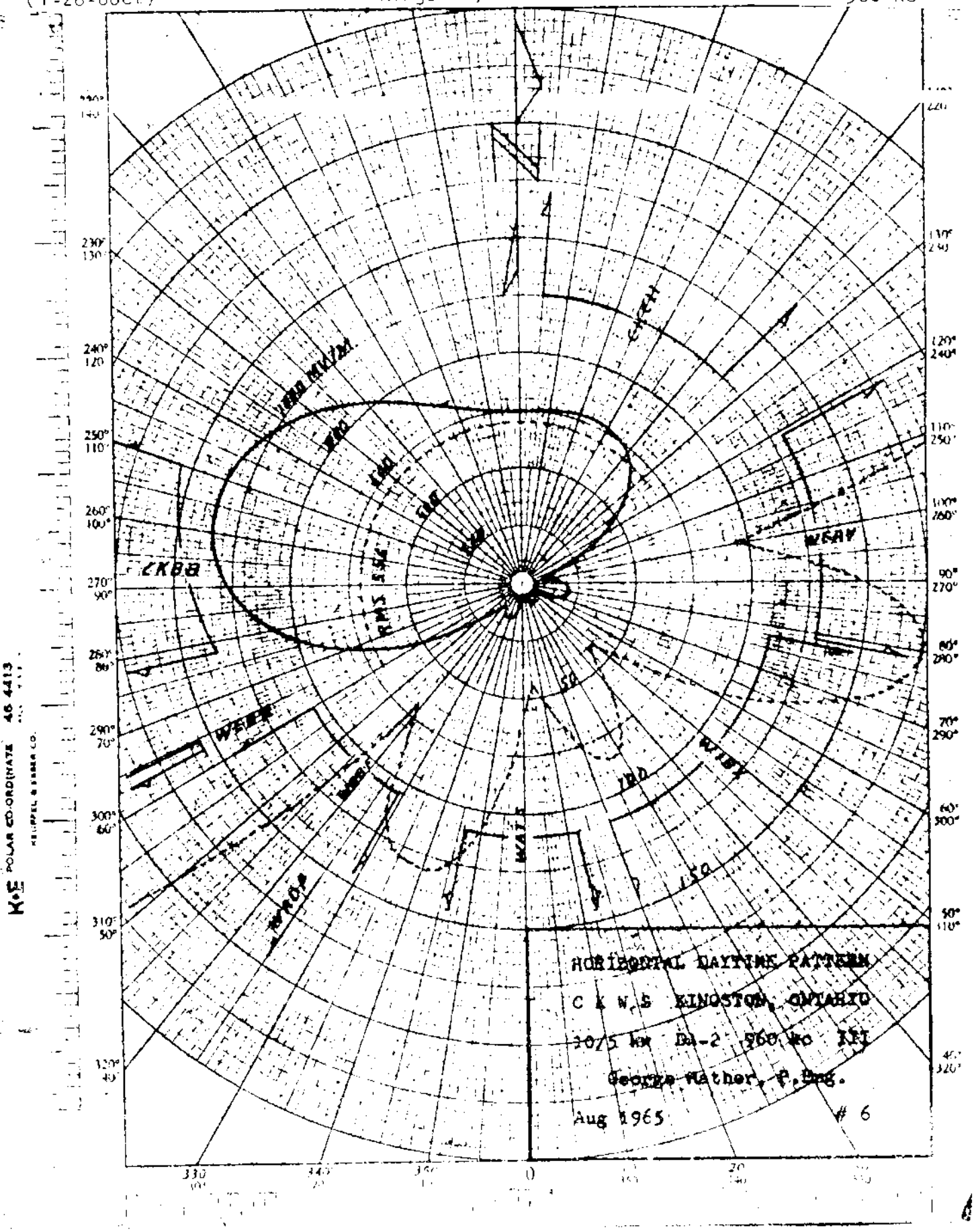
#206

CKWS

Proposed Day
(1-28-66ct)

Station CKWS
Kingston, Ontario

5kw,10kw-LS,DA-2,U,Class III
960 kc



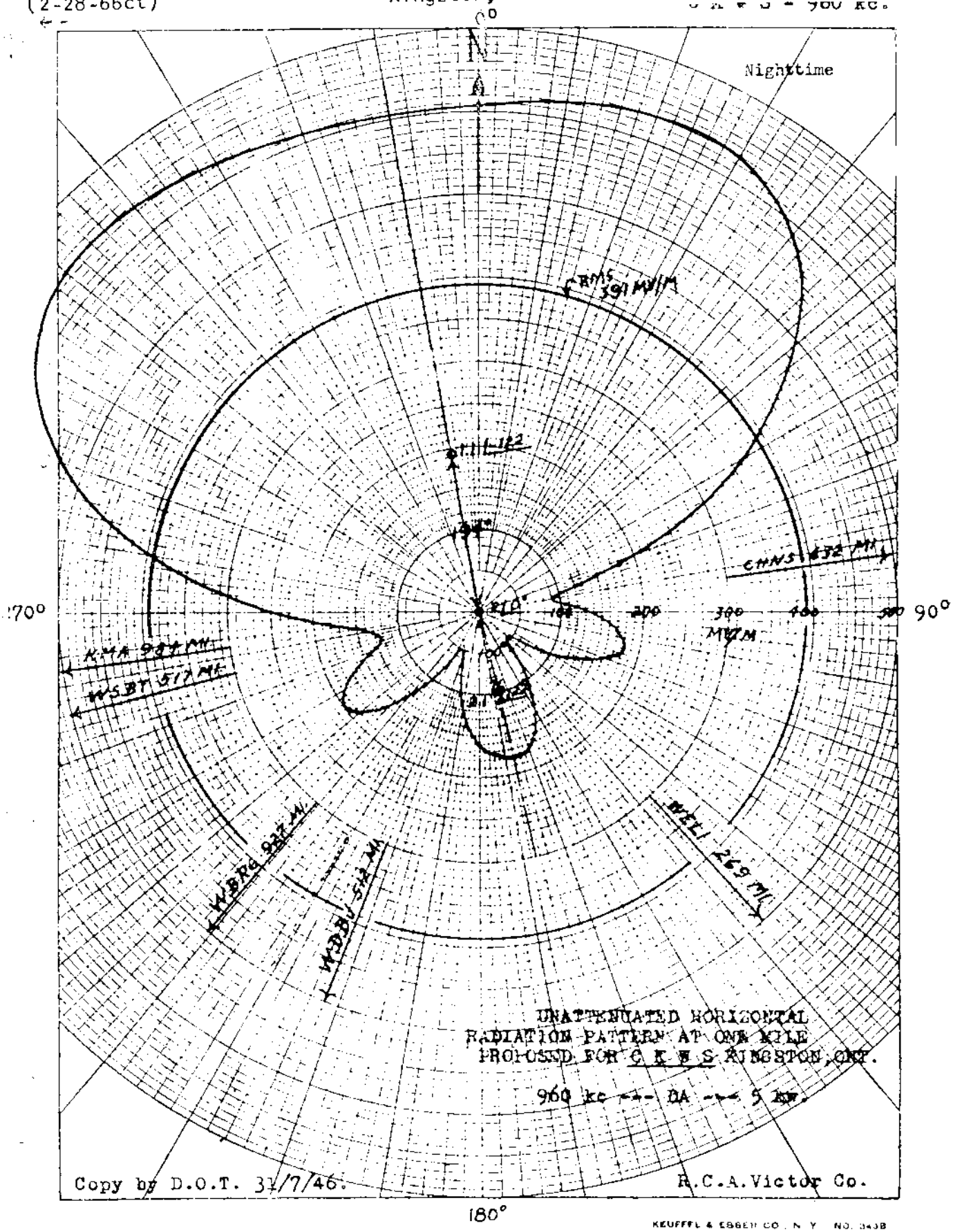
#206

CKWS

Proposed Night
(2-28-66ct)

Station CKWS
Kingston, Ontario

5kw,10kw-LS,DA-2,U,Class III
960 kc



KEUFFEL & ESSER CO. N.Y. NO. 343B
POLAR COORDINATE

WITH 570

NIGHT

CKWS
960

Description of Proposed Antenna

Station CKWS — Main Studio Kingston, Ont.

Power 5000 watts — Frequency 960 kc

(a) Location: ~~Lat. 48° 10' 51" Long. 76° 27' 49"~~ New Location: Lat. 44°-10'-51" North (LAT. CORRECTED) Long. 76°-27'-49" West.

(b) Number of radiators: 3

(c) Type of radiators: Identical guyed radiators of uniform cross-section, insulated at the base for series feed. No top loading is used.

(d) Height of radiator above base insulator: 175 ft.

(e) Height of radiator above ground level: 180 ft. (60°)

(f) Overall height of towers above mean sea level: 451 ft.

(g) Orientation: See Fig. 1

(h) Spacing: Middle tower to north tower - 553 ft. (194o)
Middle tower to south tower - 285 ft. (100°)

(i) Current ratio and phasing: North tower - 1.1 ∠-122°
Middle tower - 2.0 ∠ 0°
South tower - 2.1 ∠ 122°

Ground system: Each radiator to have a ground system comprising 120 radials with lengths as shown in Fig. 1. The radials will be bonded together at the radiators and where possible, will be buried to a depth of at least 6 inches.

2/5

NEW
960kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: NEW

Main Studio: Mount Pocono, Pennsylvania

Frequency: 960 kHz

Power: 1kw Day

Notification List No. 1788

Date: August 22, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 41° 04' 41"
West Longitude: 75° 23' 33"

ANTENNA CHARACTERISTICS

Authorized for Daytime operation. (DA-D)
Number of elements: 4
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWERS:	C(#1)	NNE(#2)	NE(#3)	ENE(#4)
HEIGHT ABOVE INSULATORS	256' (90°)	256'	256'	256'
DAY PHASING:	0°	-59.65°	+221.88°	+162.24°
DAY FIELD RATIO:	1	1	1	1

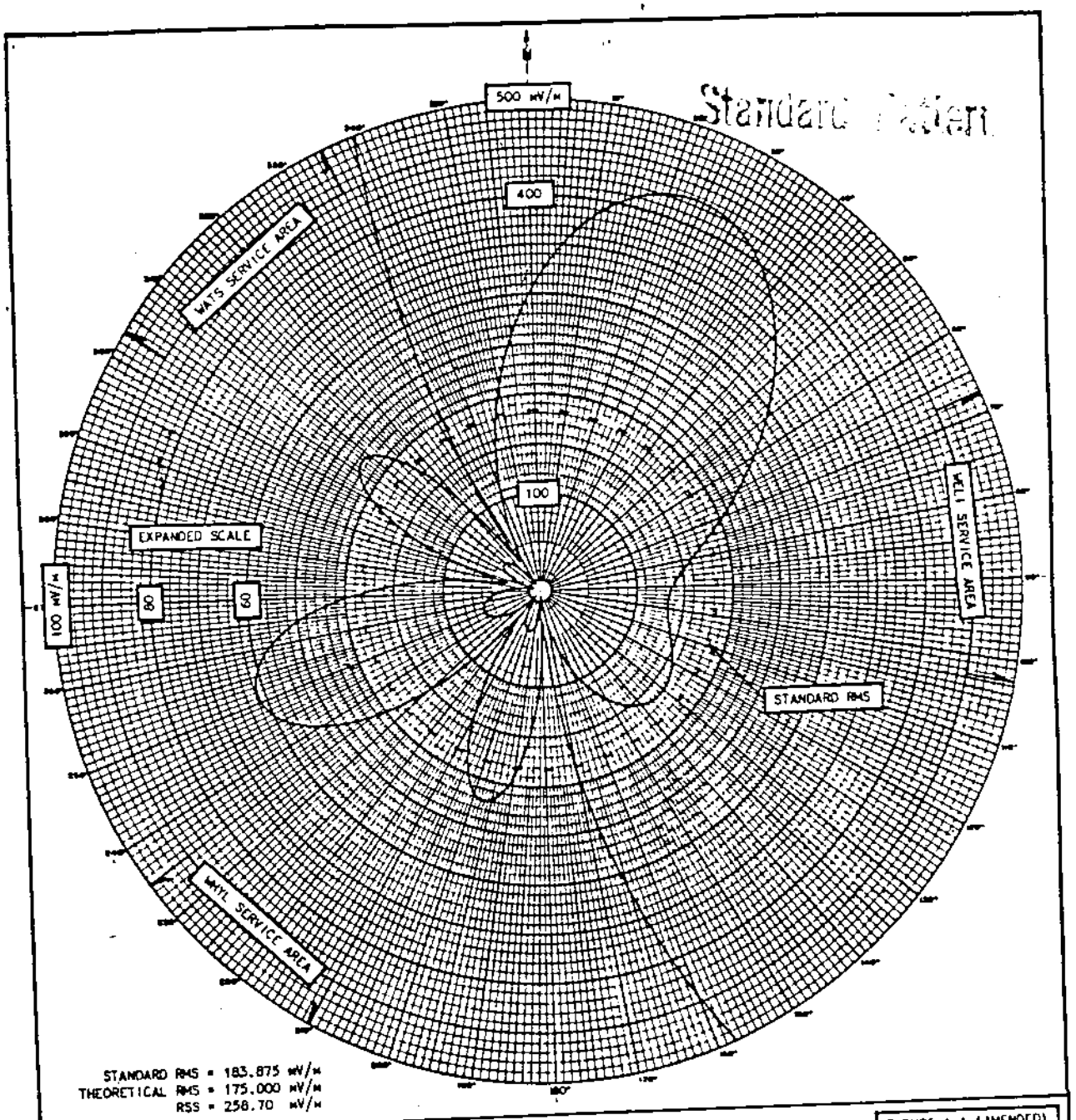
SPACING AND ORIENTATION: The towers are located at the vertices of a parallelogram the long sides of which are 569' (200°) in length on a line bearing 92.5° true. The short sides are 199' (70°) in length on a line bearing 51° true.

GROUND SYSTEM: 120 - 256' to equally spaced copper radials plus 120 - 50' interspaced radials about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	175 mv/m	258.7 mv/m	183.875 mv/m

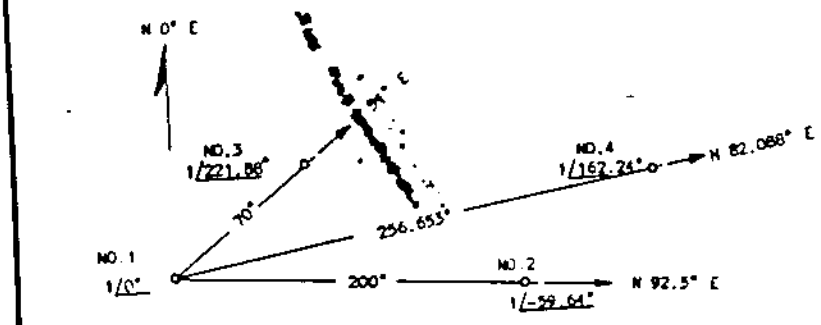
NEW
-960 kHz



STANDARD HORIZONTAL RADIATION PATTERN

FIGURE 1-A (AMENDED)

SPACING AND ORIENTATION



G = 90° (ALL TOWERS)

APPLICANT	: MOUNT POCONO BCSTG, INC.
LOCATION	: MOUNT POCONO, PENNSYLVANIA
FREQUENCY	: 960 kHz
POWER	: 1 kW
LATITUDE	: 41 DEG. 04 MIN. 41 SEC.
LONGITUDE	: 75 DEG. 23 MIN. 33 SEC.
TIME USED	: DAYTIME
R.M.S. FIELD	: 183.875 mV/m (STANDARD)
DATE	: NOVEMBER 1979

SILLIMAN, MUFFET & KOWALSKI
CONSULTING RADIO ENGINEERS

KABL

PROPOSED DAY & NIGHT
(6-16-59g)

Station KABL
Oakland, California

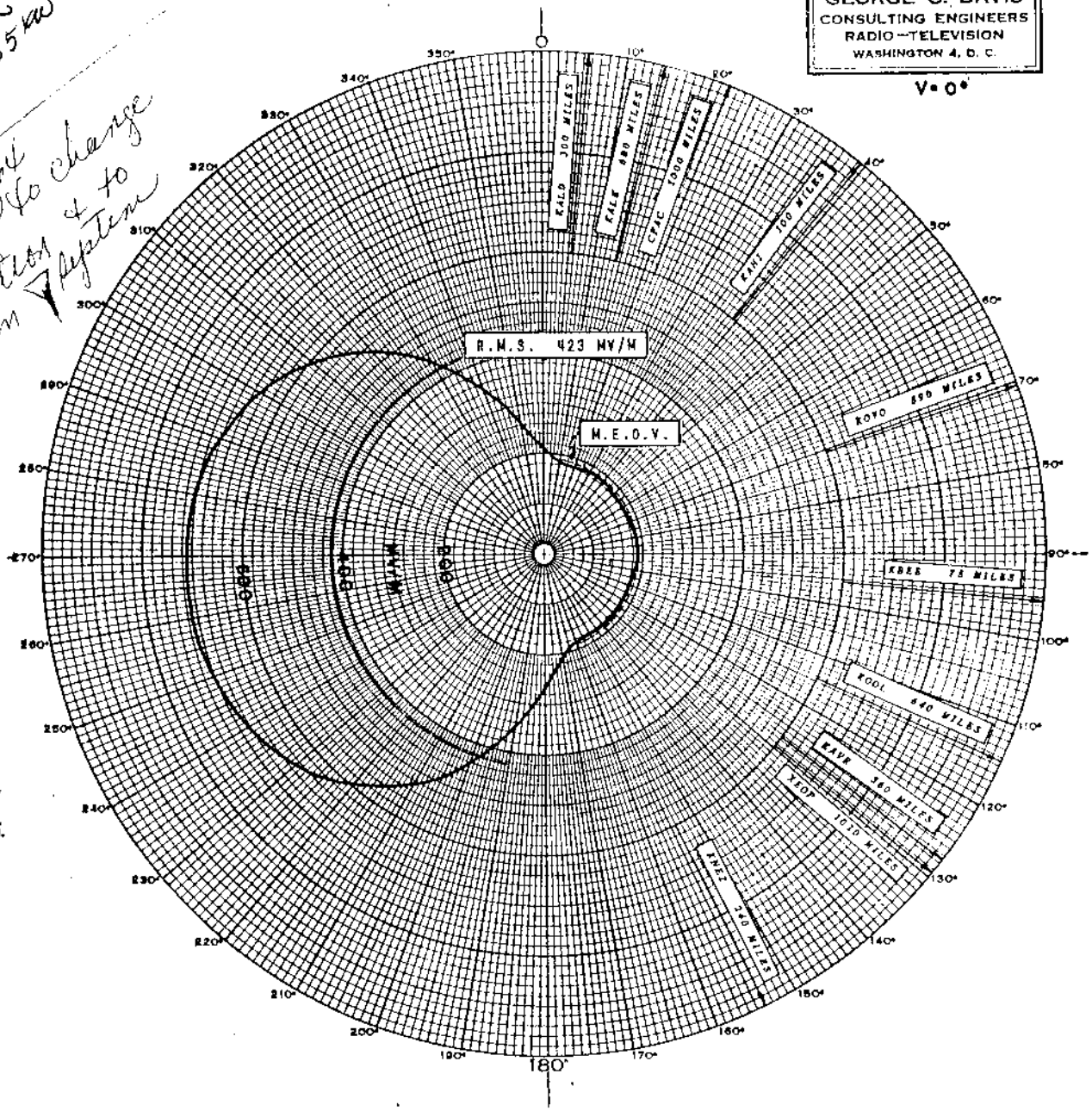
5kw, DA-1, U
960 KC

GEORGE C. DAVIS
CONSULTING ENGINEERS
RADIO—TELEVISION
WASHINGTON 4, D. C.

V=0°

5-29-62 granted increase in power to 5 kw with DA-1.

#200 granted 8-19-64 permit to change site & to make changes in system



#169-C/T - Jan 24-62 amend to change site:
NL: 37-45-04
WL: 122-22-52

NL 37° 49' 44"
WL 122° 18' 40"

1.0/4122° 0.7636/0° .264/-122°
N 85° E
S = 95° = 270' H = 88° = 250'

COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR PROPOSED OPERATION OF
KROW, OAKLAND, CALIFORNIA
960 KC, 5 KW, DA-1
APRIL 1959

FCC File No. BP-13010
Accepted 5-20-59

KABL
Oakland, California

960 KC

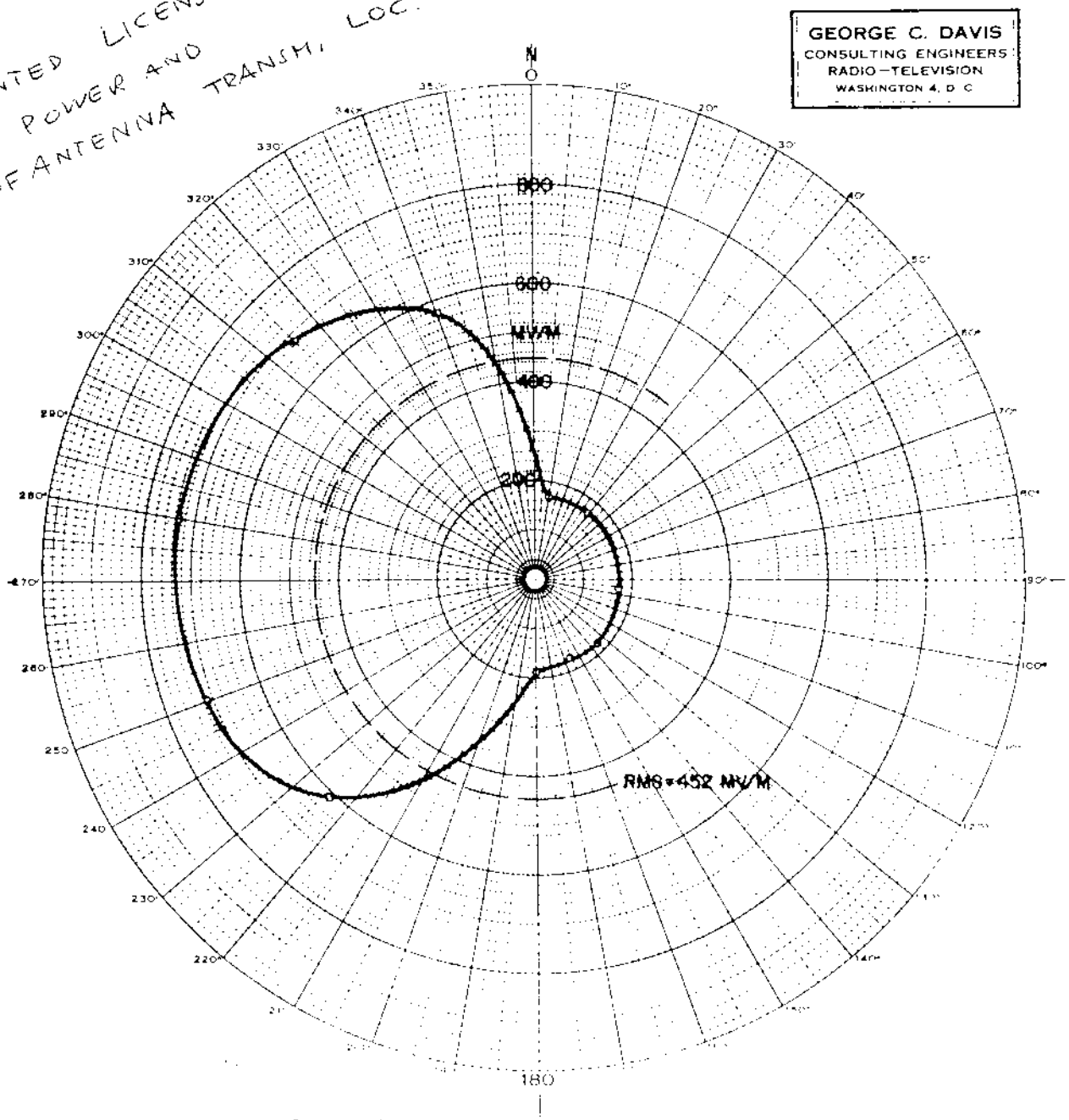
KABL

Measured Day & Night
(11-29-65ct)

Station KABL
Oakland, California

5kw,DA-1,U
960 kc

H16-67 GRANTED LICENSE
INCREASE IN POWER AND
CHANGE OF ANTENNA TRANSM. LOC.



North Latitude 37° 40' 40"
West Longitude 122° 18' 53"

MEASURED HORIZONTAL PLANE PATTERN
KABL, OAKLAND, CALIFORNIA
960 KC - 5 KW - DA-1
SEPTEMBER 1965

MEASURED PARAMETERS

1052/18° — 95° — 1/0° — 95° — 0471/-12°

H=88° = 250 FEET
S=95° = 270 FEET
LINE OF TOWERS N 100° E

FCC File No. BL-11113
Accepted 10-29-65

Station KABL
Oakland, California

960 kc

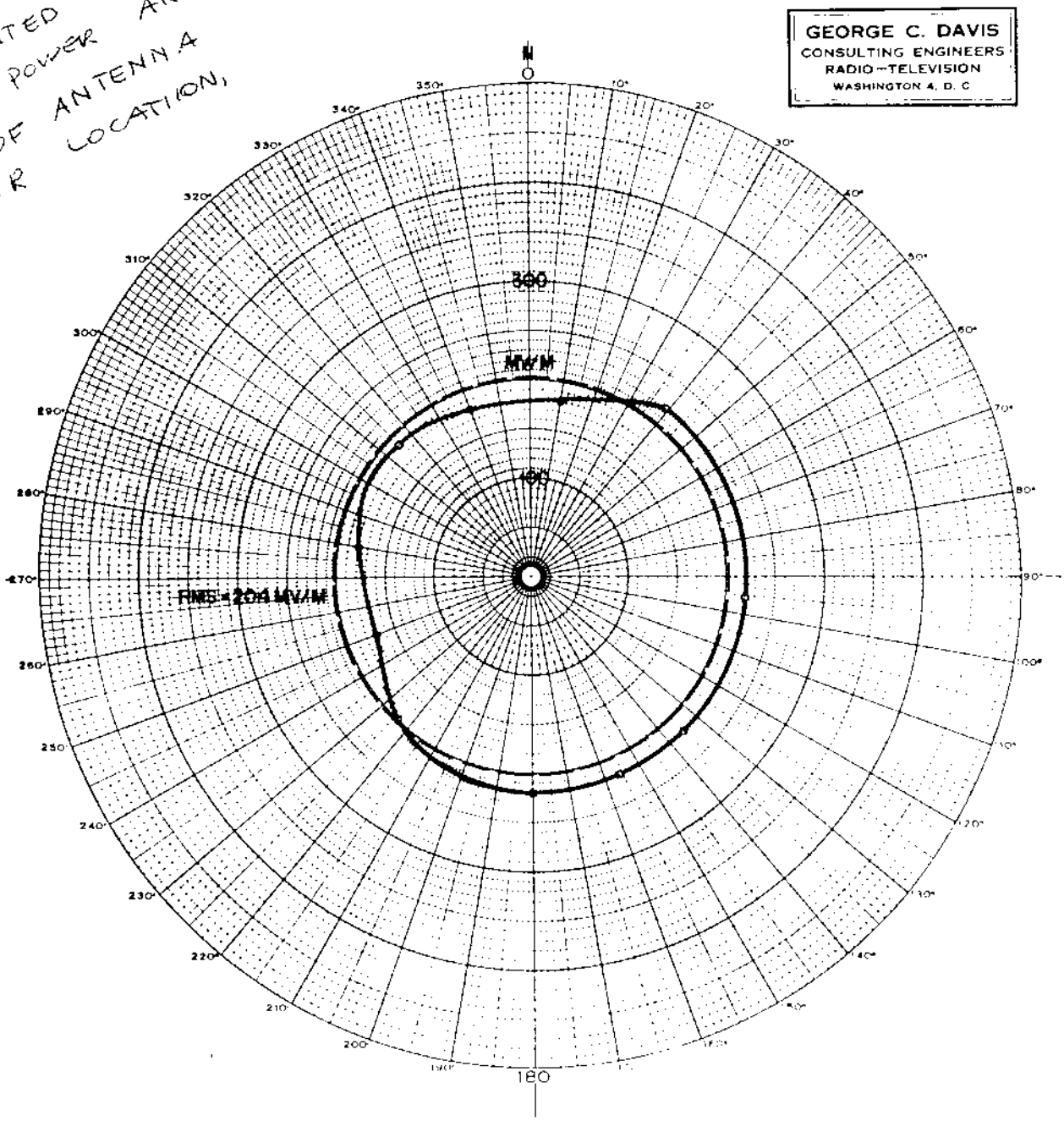
KABL

Measured Non-DA
(11-29-65ct)

Station KABL
Oakland, California

5kw,DA-1,U
960 kc

1-16-67 GRANTED LICENSE INCREASE IN POWER AND CHANGE OF ANTENNA TRANSMITTER LOCATION,



MEASURED NON-DIRECTIVE PATTERN
KABL, OAKLAND, CALIFORNIA
960 KC - 1 KW
SEPTEMBER 1965

FCC File No. BL-11113
Accepted 10-29-65

Station KABL
Oakland, California

960 kc

KALE

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station	: KALE	Main Studio:	Richland, Washington
Frequency	: 960 kHz	Power	: 1kw Night 5kw Day
Notification List No.:	1752	Date	: October 5, 1977 Class:

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude:	46°	14'	34"
West Longitude:	119°	10'	48"

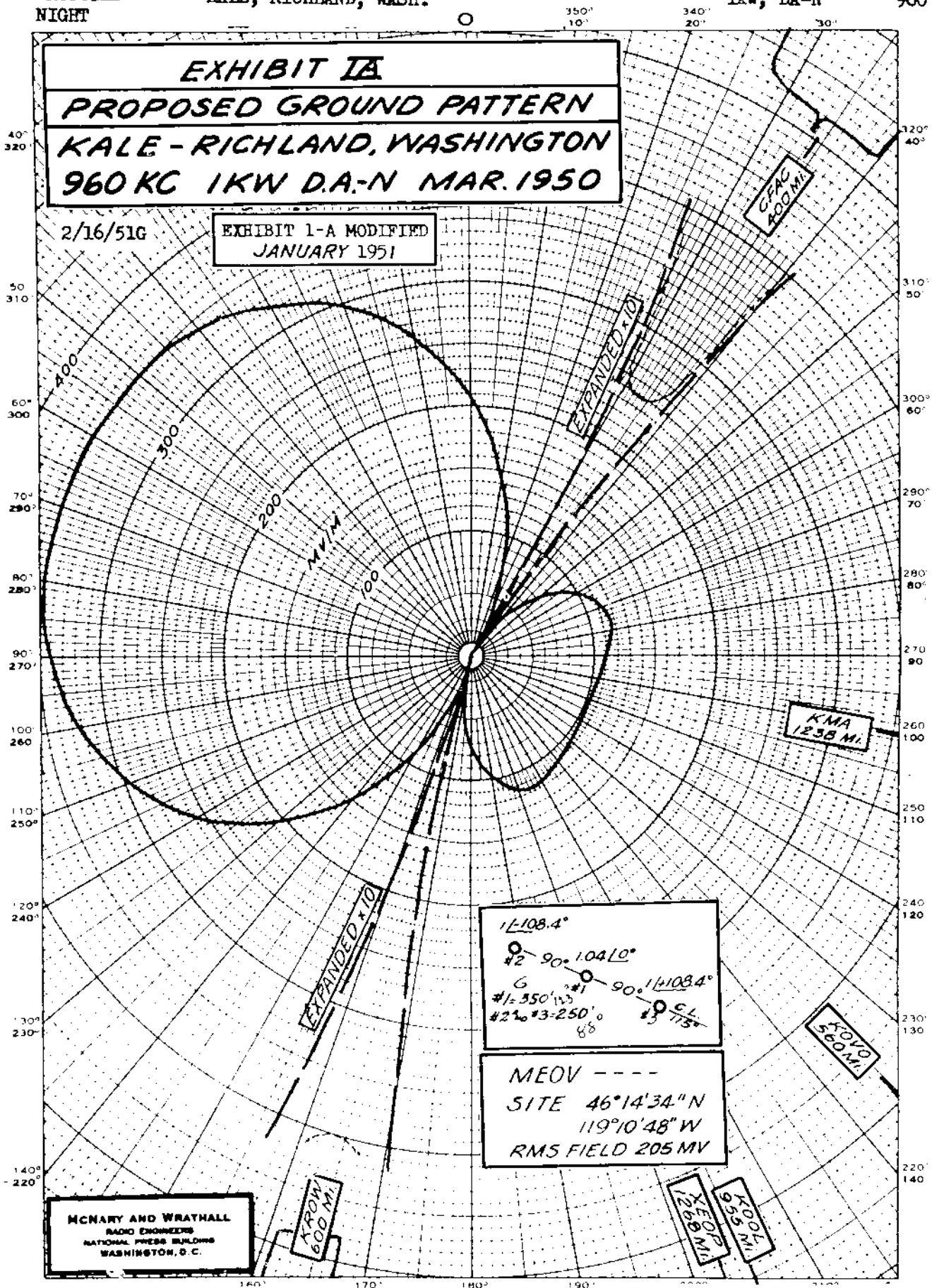
Authorized for Night operation (DA-N)

PREDICTED EFFECTIVE DAY FIELD: (omnidirectional center tower) 454 mv/m at rated power.

Note: Please retain the description sheet and directional antenna radiation patterns notified for Station KALE in United States Change List Number 397, dated March 21, 1951 and attach to this supplemental Description Sheet. This notification is for the purpose of indicating an increase in daytime power from 1 kw with no change in the nighttime operation.

KALE

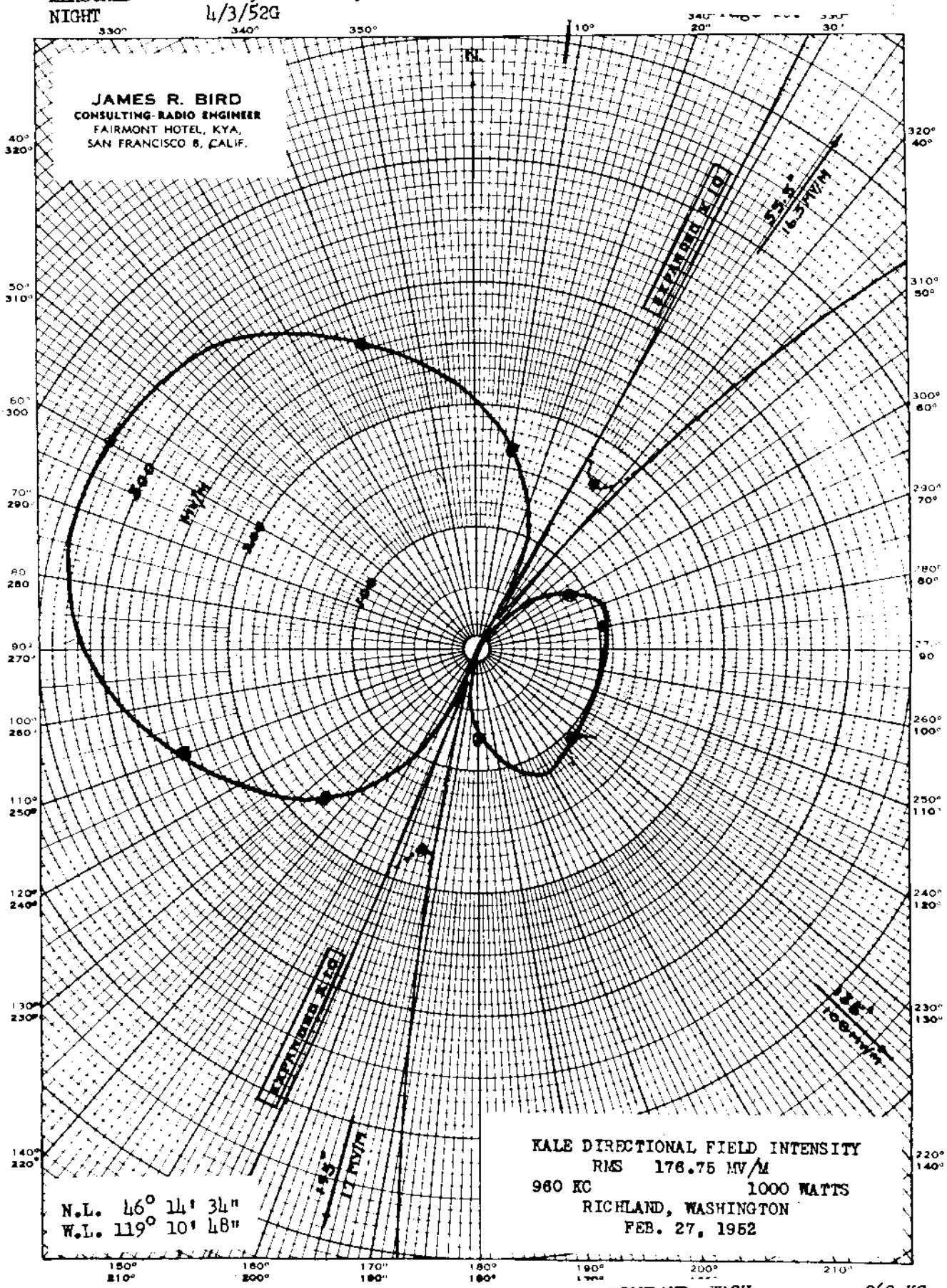
PROPOSED NIGHT — KALE, RICHLAND, WASH. — 1kw, DA-N — 960 kc



AMENDED 2/7/51 BP-7728 — KALE, Richland, Wash. 960 kc

KALE

MEASURED NIGHT — KALE, RICHLAND, WASH. 4/3/52G — 1 KW, U, DA-N — 960 KC

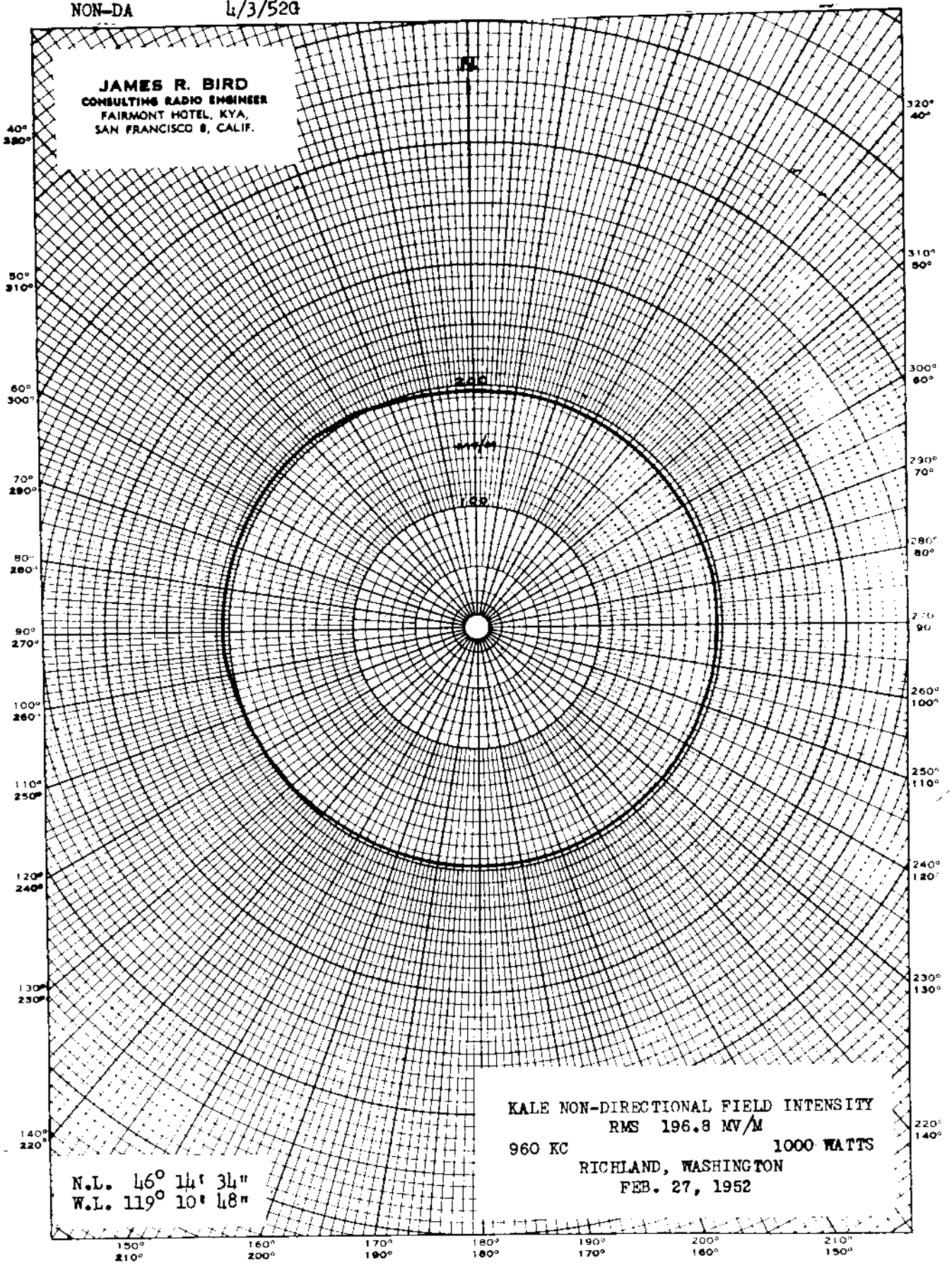


APPL RECD 3/6/52 ACC 4/2/52 BL-4693

KALE, RICHLAND, WASH. 960 KC

KALE

MEASURED KALE, RICHLAND, WASH. 1 KW, U, DA-N 960 KC
NON-DA 4/3/52



APPL RECD 3/6/52 ACC 4/2/52 BL-4693 KALE, RICHLAND, WASH. 960 KC

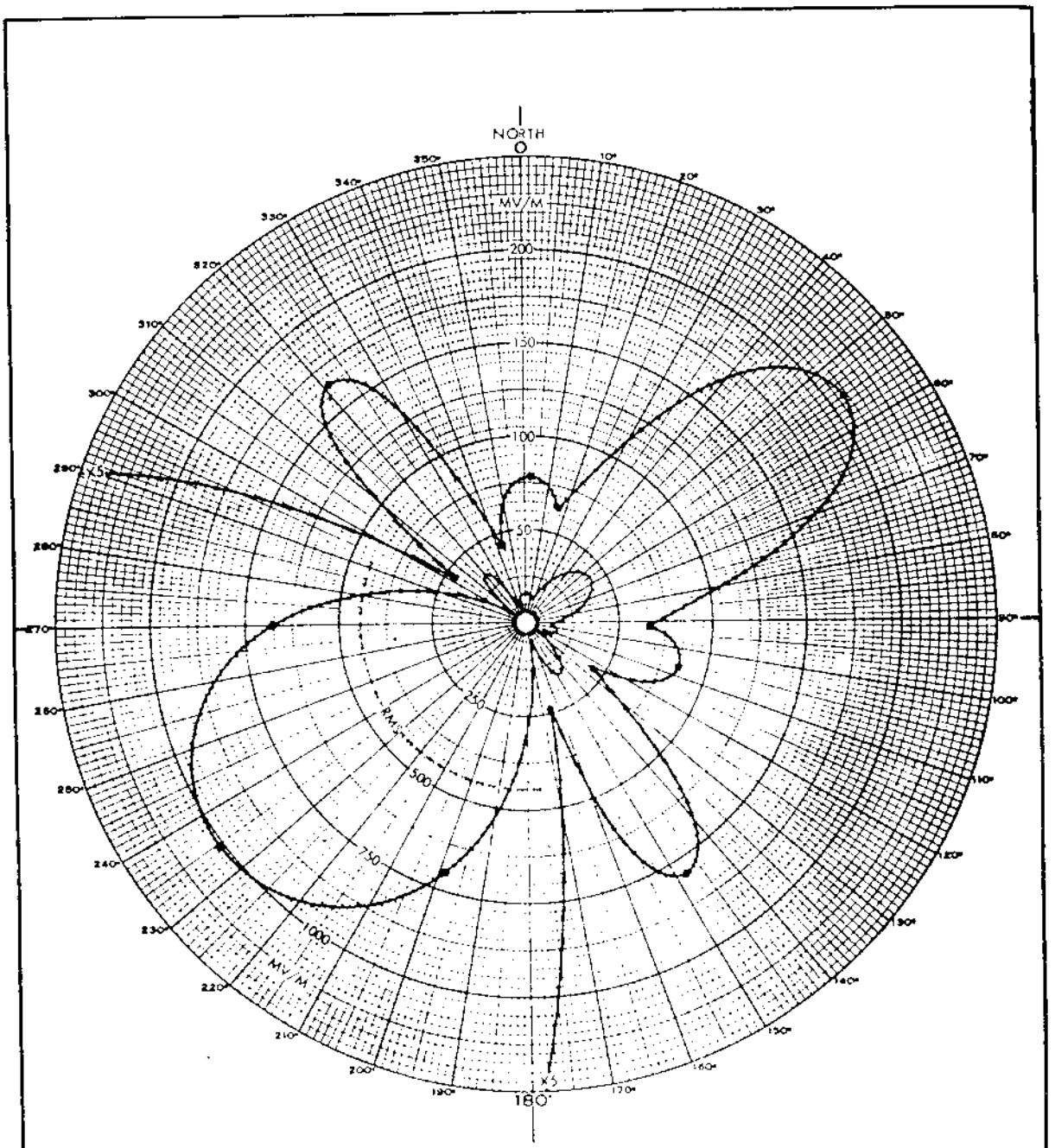
KARZ ~~KOOL~~

Measured Night
(8-26-66ct)

Station KOOL
Phoenix, Arizona

5kw,DA-N,U
960 kc

LIC 9-26-66



THEORETICAL
4 0.433/-58.7°
3 0.932/155.9°
2 1.000/0.0°
1 0.636/-153.1°
N234.5°E

OPERATING
4 0.455/59°
3 0.919/159°
2 1.000/0.0°
1 0.631/-150°
N234.5°E

N. LAT. 33° 39' 12"
W. LONG. 111° 55' 39"

RMS=447 MV/M

G=90°-256'
S-110°-314'

HAMMETT & EDISON
CONSULTING RADIO ENGINEERS
SAN FRANCISCO

RADIO STATION KOOL
960 KC 5 KW. DA N
PHOENIX. ARIZONA

MEASURED DIRECTIONAL HORIZONTAL RADIATION

UNATTENUATED FIELD INTENSITY AT ONE MILE

66/0601

FIGURE 10B

FCC File No.BL-11373
Accepted 8-10-66

Station KOOL
Phoenix, Arizona

960 kc

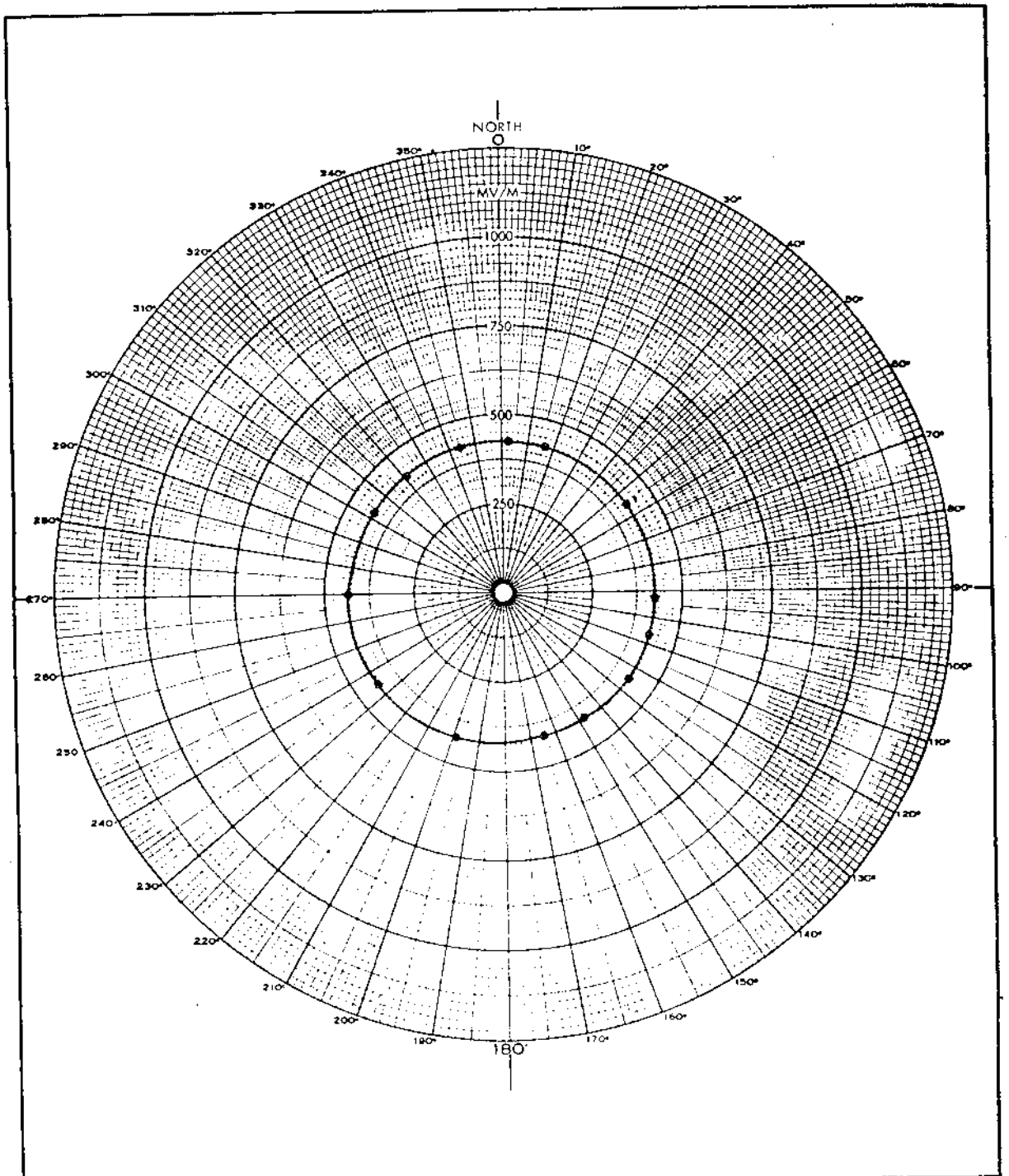
KARZ ~~KOOL~~

Measured Non-DA
(8-26-66ct)

Station KOOL
Phoenix, Arizona

5kw,DA-N,U
960 kc

IC 9-26-66



N LAT. 33° 39' 12"
W LONG 111° 55' 39"

RMS=425 MV/M
G=90°=256'

5 KW INTO TOWER 3 WITH TOWERS 1 2 AND 4 FLOATING

HAMMETT & EDISON
CONSULTING RADIO ENGINEERS
SAN FRANCISCO

RADIO STATION KOOL
960 KC. 5 KW DA N
PHOENIX, ARIZONA

MEASURED NON-DIRECTIONAL HORIZONTAL RADIATION

UNATTENUATED FIELD INTENSITY AT ONE MILE

660601

FIGURE 10A

FCC File No.BL-11373
Accepted *-10-66

Station KOOL
Phoenix, Arizona

960 kc

KARZ ~~KOOL~~

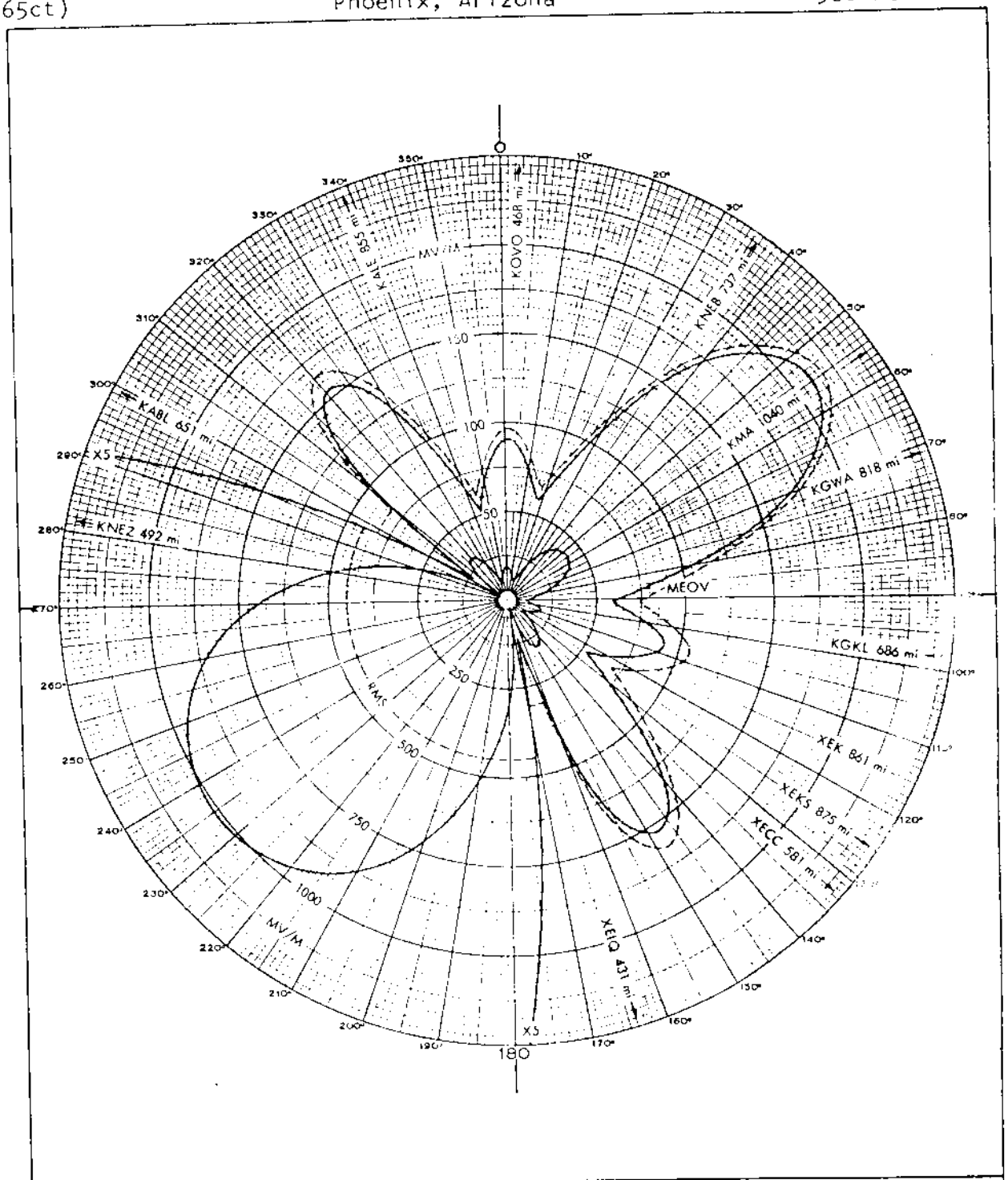
Proposed Night
(9-28-65ct)

Station KOOL
Phoenix, Arizona

5kw,DA-N,U
960 kc

BP 16694
CP 10-18-65
CHG NIGHT LOC.
(TWO SITES)

BP 17260
CHG DAY LOC
CP 8-12-66



N. LAT. 33° 39' 02"
W. LONG. 111° 55' 43"

S = 110° = 314'
G = 90° = 256'
RMS = 450 MV/M

N234.5°E
1 • 0.636/-153.1°
2 • 1.000/0.0°
3 • 0.932/155.9°
4 • 0.433/-58.7°

PROPOSED HORIZONTAL RADIATION NIGHTTIME

UNATTENUATED FIELD INTENSITY AT ONE MILE

HAMMETT & EDISON
CONSULTING RADIO ENGINEERS
SAN FRANCISCO

RADIO STATION KOOL
960 KC. 5 KW. DA-N
PHOENIX, ARIZONA

650326

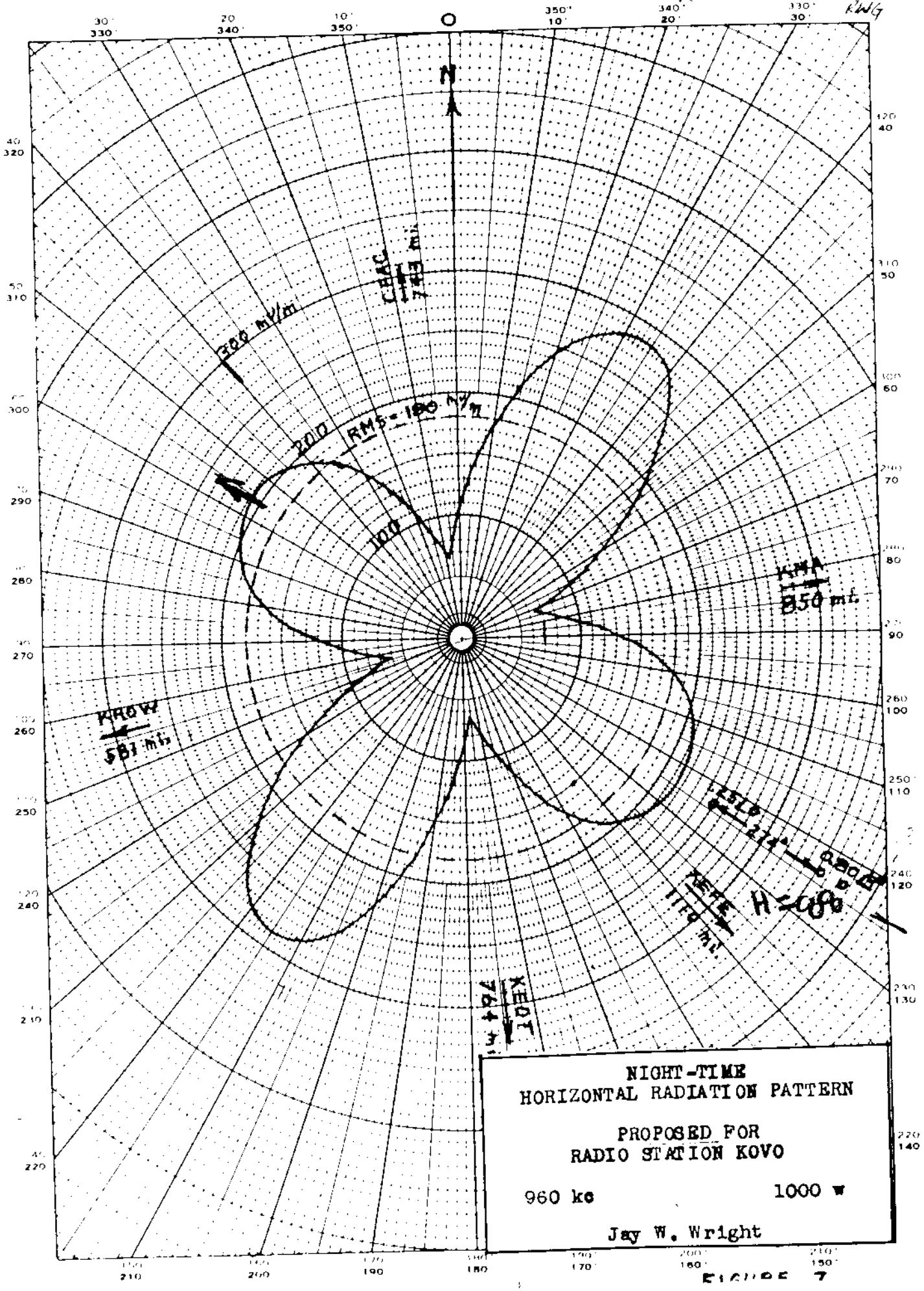
FIGURE 5B

FCC File No. BP-16694
Accepted 8-31-65

Station KOOL
Phoenix, Arizona

960 kc

PROVUTUIMA
CK-LIC PATTERN 6/46
RWG



NIGHT-TIME
HORIZONTAL RADIATION PATTERN

PROPOSED FOR
RADIO STATION KOVO

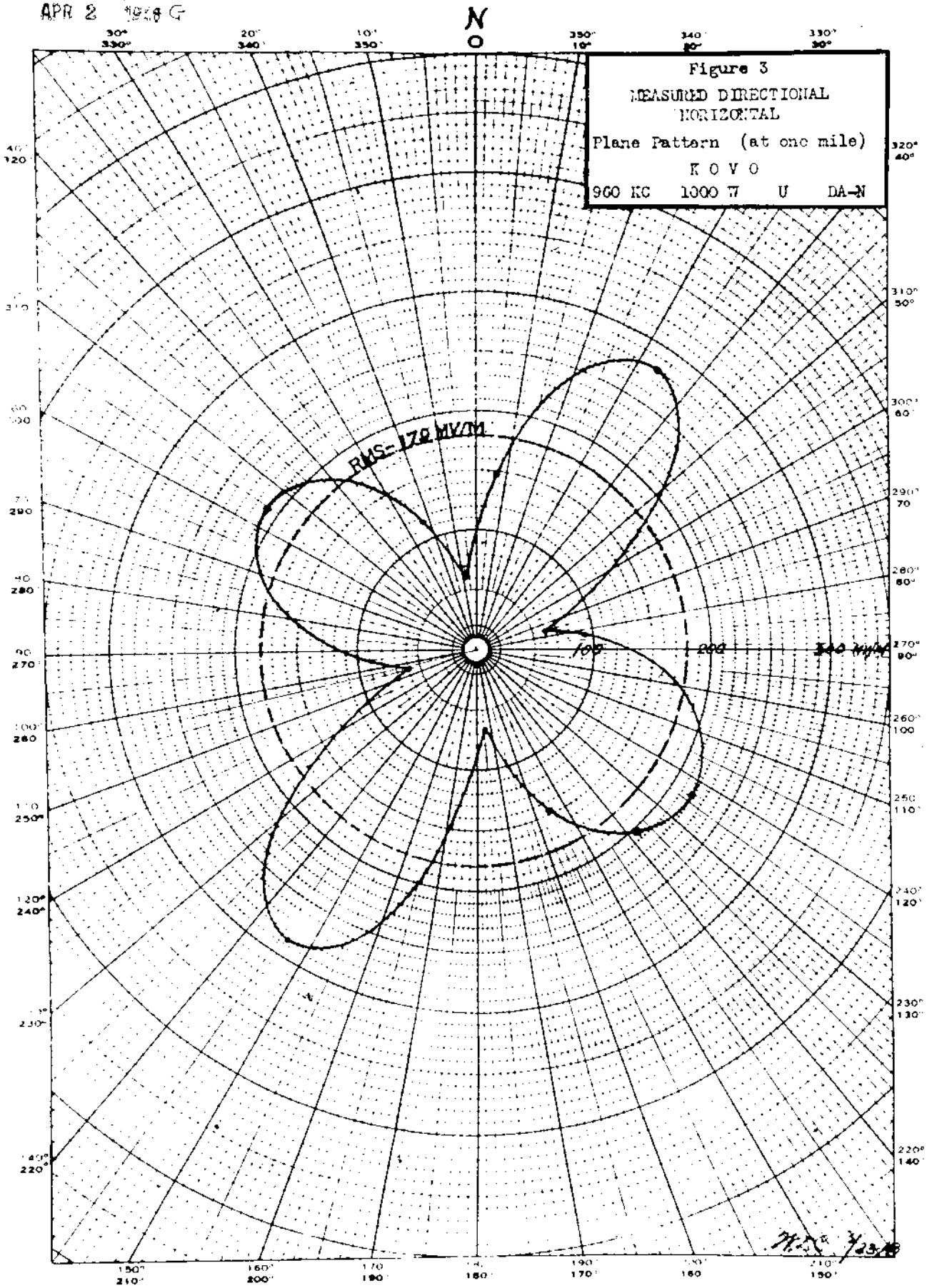
960 kc 1000 w

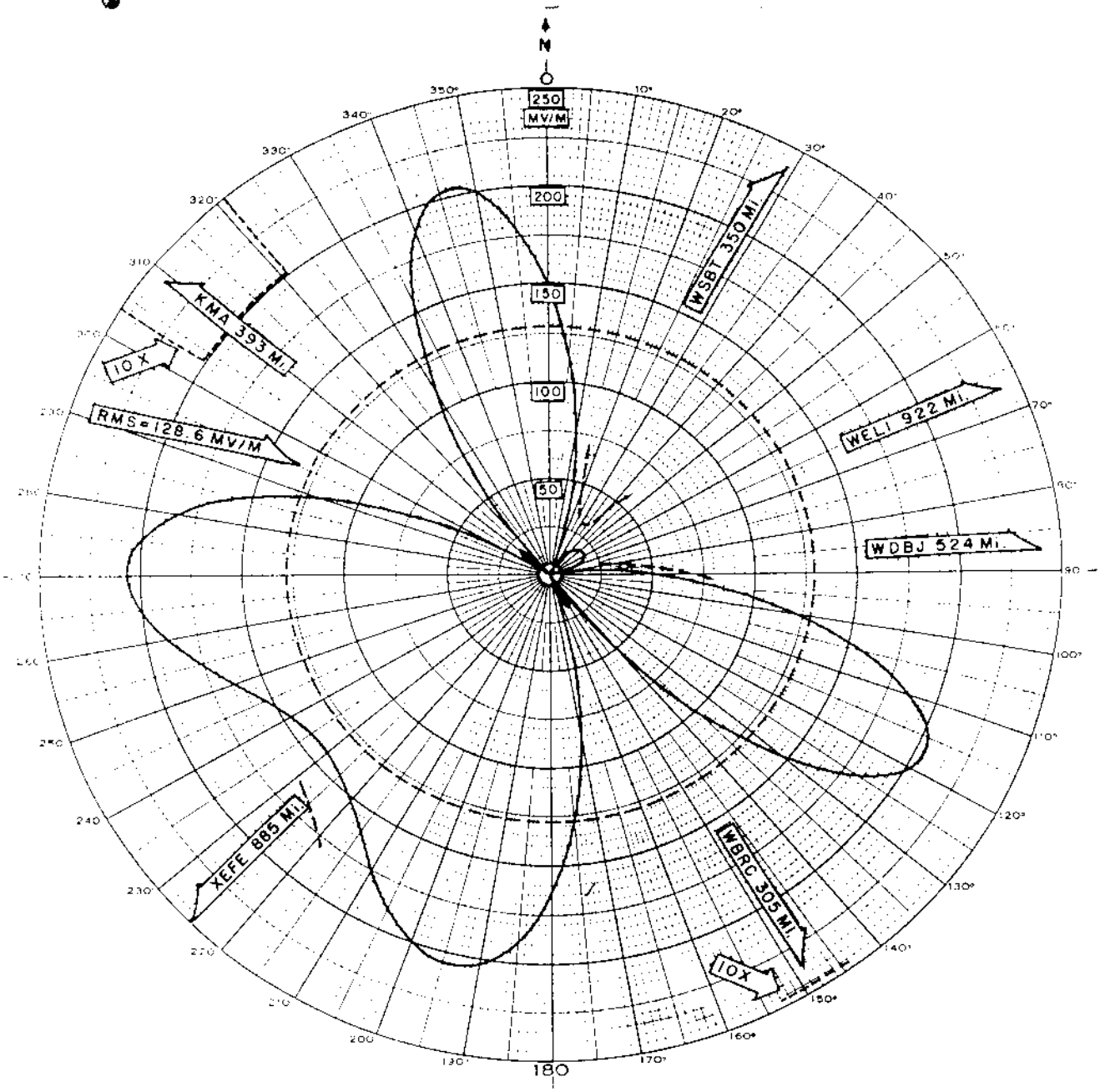
Jay W. Wright

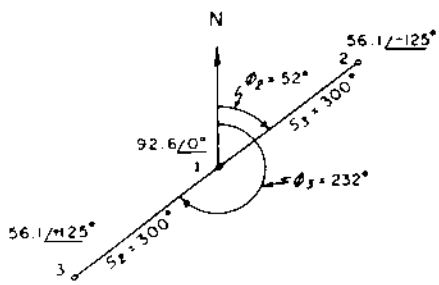
FIGURE 7

KAYK PROVO, UTAH ~~KOVO~~ 960

APR 2 1948 G





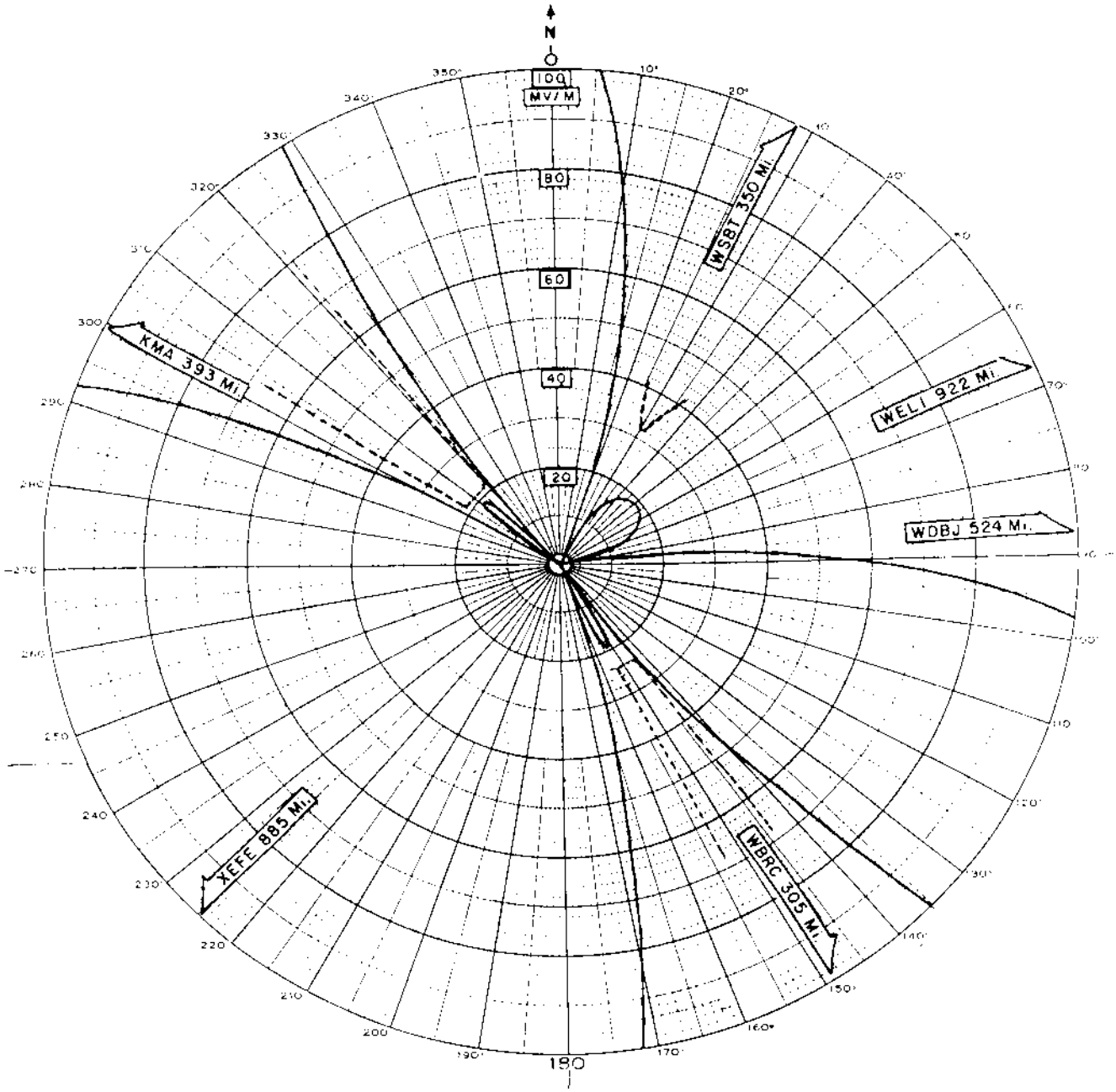
ANTENNA PLACEMENT SKETCH	PATTERN SHAPE PARAMETERS							PATTERN SIZE	
	ANTENNA No	TRUE ORIENTATION $\phi°$	SPACING $S°$	PHASING $\psi°$	FIELD RATIO r	HORIZONTAL FIELD INTENSITY $E_{mv/m}$	ELECTRICAL HEIGHT $h°$	ELEVATION ANGLE $\theta°$	RMS FIELD INTENSITY mv/m E_0
	1	0	0	0	1.0	92.6	90	0	128.6
	2	52	300	-125	0.606	56.1	90	10	
	3	232	300	+125	0.606	56.1	90	20	
	4							30	
	5							40	
	6							50	
	7							60	
	8							70	
	9							80	
	10							E_s =	mv/m
	11							P_r =	kw

Applicant OSCAR C. HIRSCH
Location CAPE GIRARDEAU, MISSOURI
FCC file B4-P-4289 Pattern No. 470207
Call Letters KFVS Supersedes 460702
Frequency 960 KC Prepared by CARL E. SMITH
Rated Power 500 W Date FEB. 7, 1947

B-4289

PROPOSED HORIZONTAL PLANE PATTERN

FIG. 1



ANTENNA PLACEMENT SKETCH	PATTERN SHAPE PARAMETERS							PATTERN SIZE	
	ANTENNA No	TRUE ORIENTATION $\phi°$	SPACING $S°$	PHASING $\psi°$	FIELD RATIO r	HORIZONTAL FIELD INTENSITY E mv/m	ELECTRICAL HEIGHT $h°$	ELEVATION ANGLE $\theta°$	RMS FIELD INTENSITY mv/m E_0
	1	0	0	0	1.0	92.6	90	0	128.6
	2	52	300	-125	0.606	56.1	90	10	
	3	232	300	+125	0.606	56.1	90	20	
	4							30	
	5							40	
	6							50	
	7							60	
	8							70	
	9							80	
	10							E_s =	mv/m
	11							Pr =	kw

Applicant	OSCAR C. HIRSCH		
Location	CAPE GIRARDEAU, MISSOURI		
FCC file	84-P-4289	Pattern No.	470207
Call Letters	KFVS	Supersedes	460702
Frequency	960 KC	Prepared by	CARL E. SMITH
Rated Power	500 W	Date	FEB. 7, 1947

P-4289

EXPANDED HORIZONTAL PLANE PATTERN

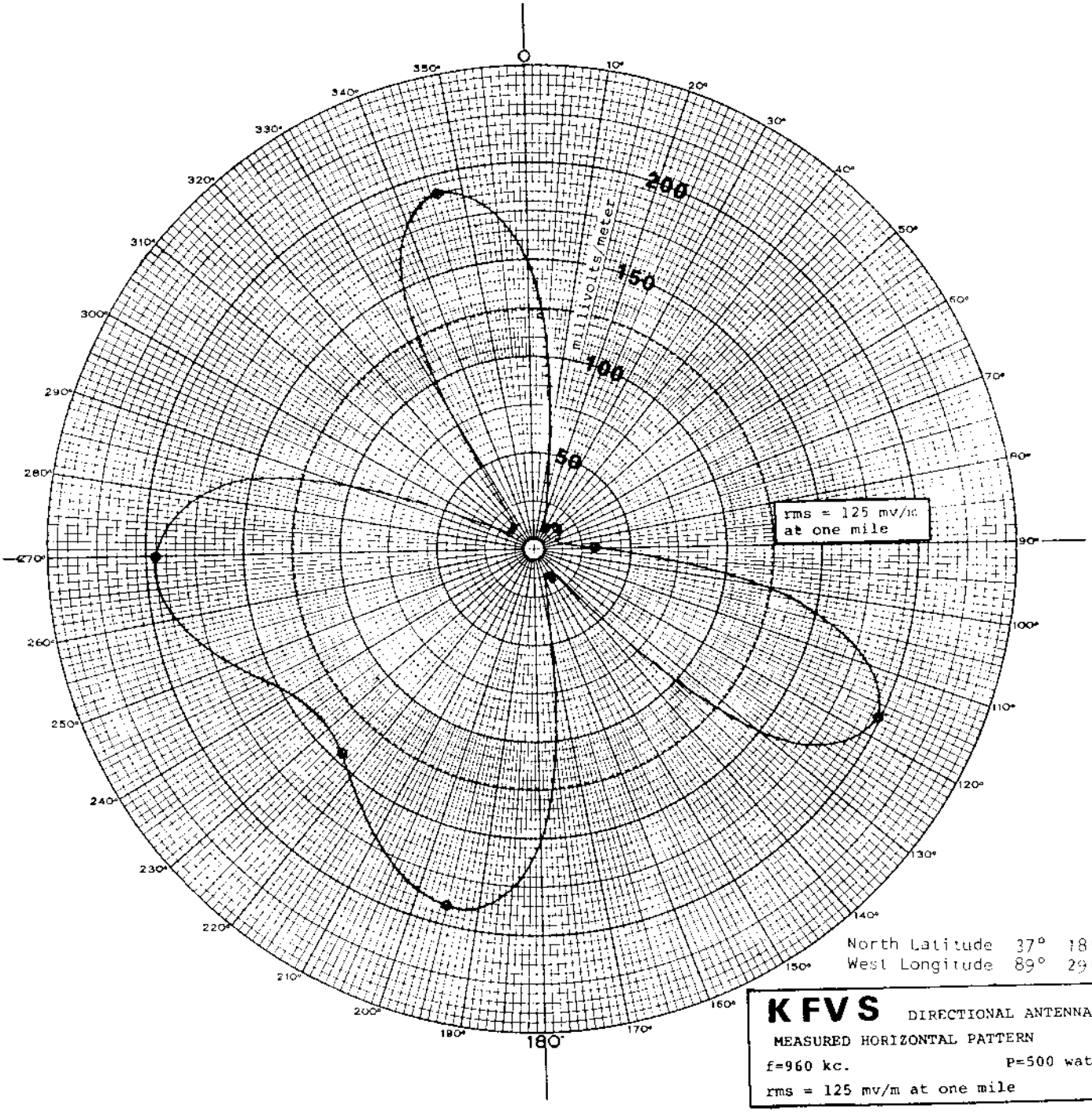
FIG. 2

KGIR ~~KFVS~~

Measured Night
(10-28-68ct)

Station KFVS
Cape Girardeau, Missouri

500w,5kw-LS,DA-N,U
960 kc



North Latitude 37° 18' 5
West Longitude 89° 29' 0

KFVS DIRECTIONAL ANTENNA
MEASURED HORIZONTAL PATTERN
f=960 kc. P=500 watts
rms = 125 mv/m at one mile

FCC File No.BZ-6970
Accepted 10-25-68

Station KFVS
Cape Girardeau, Missouri

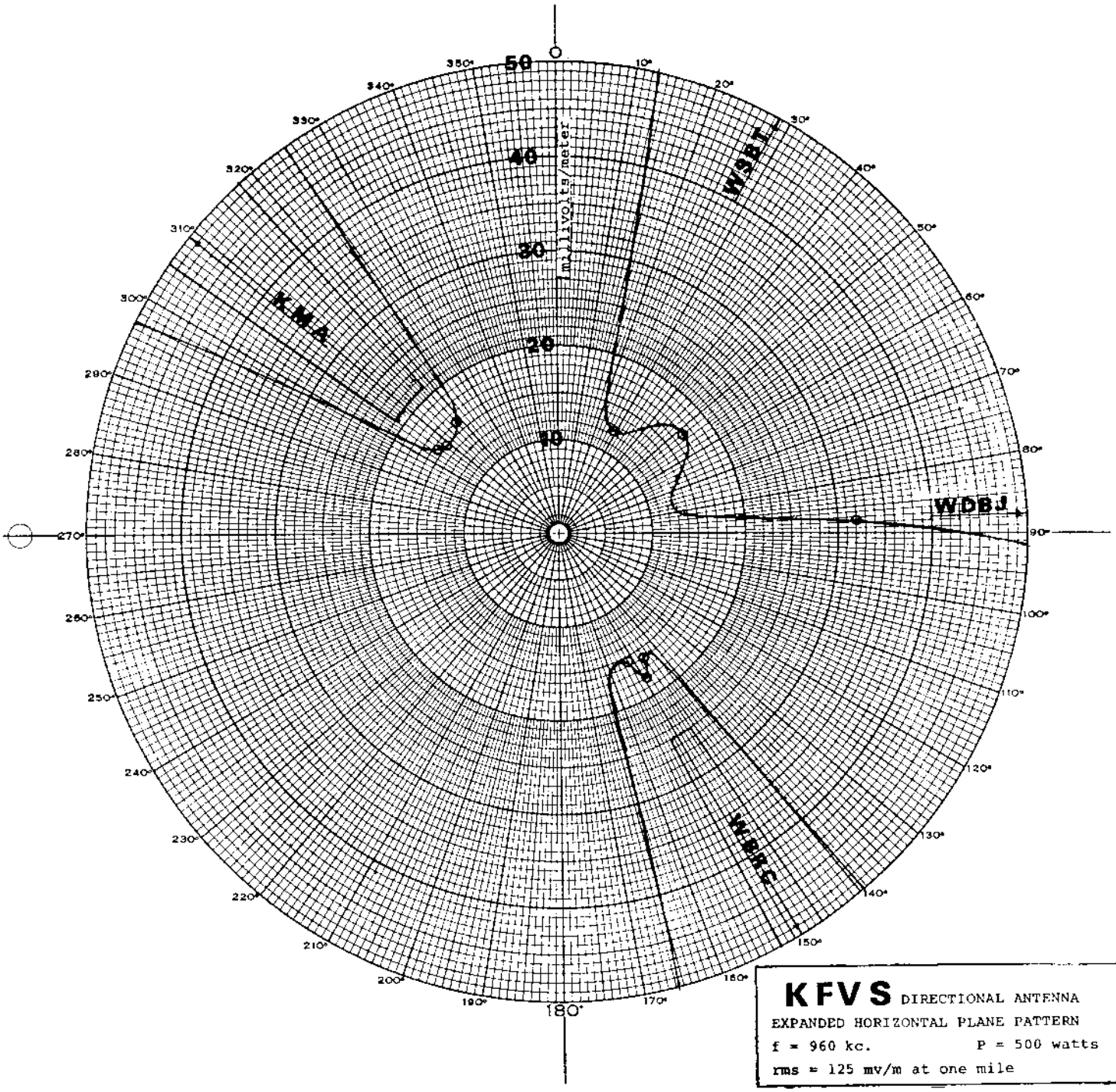
960 kc

KGIK ~~KFVS~~

Measured Night Nulls
(10-28-68ct)

Station KFVS
Cape Girardeau, Missouri

500w,5kw-LS,DA-N,J
960 kc



KFVS DIRECTIONAL ANTENNA
EXPANDED HORIZONTAL PLANE PATTERN
f = 960 kc. P = 500 watts
rms = 125 mv/m at one mile

FCC File No.BZ-6970
Accepted 10-25-68

Station KFVS
Cape Girardeau, Missouri

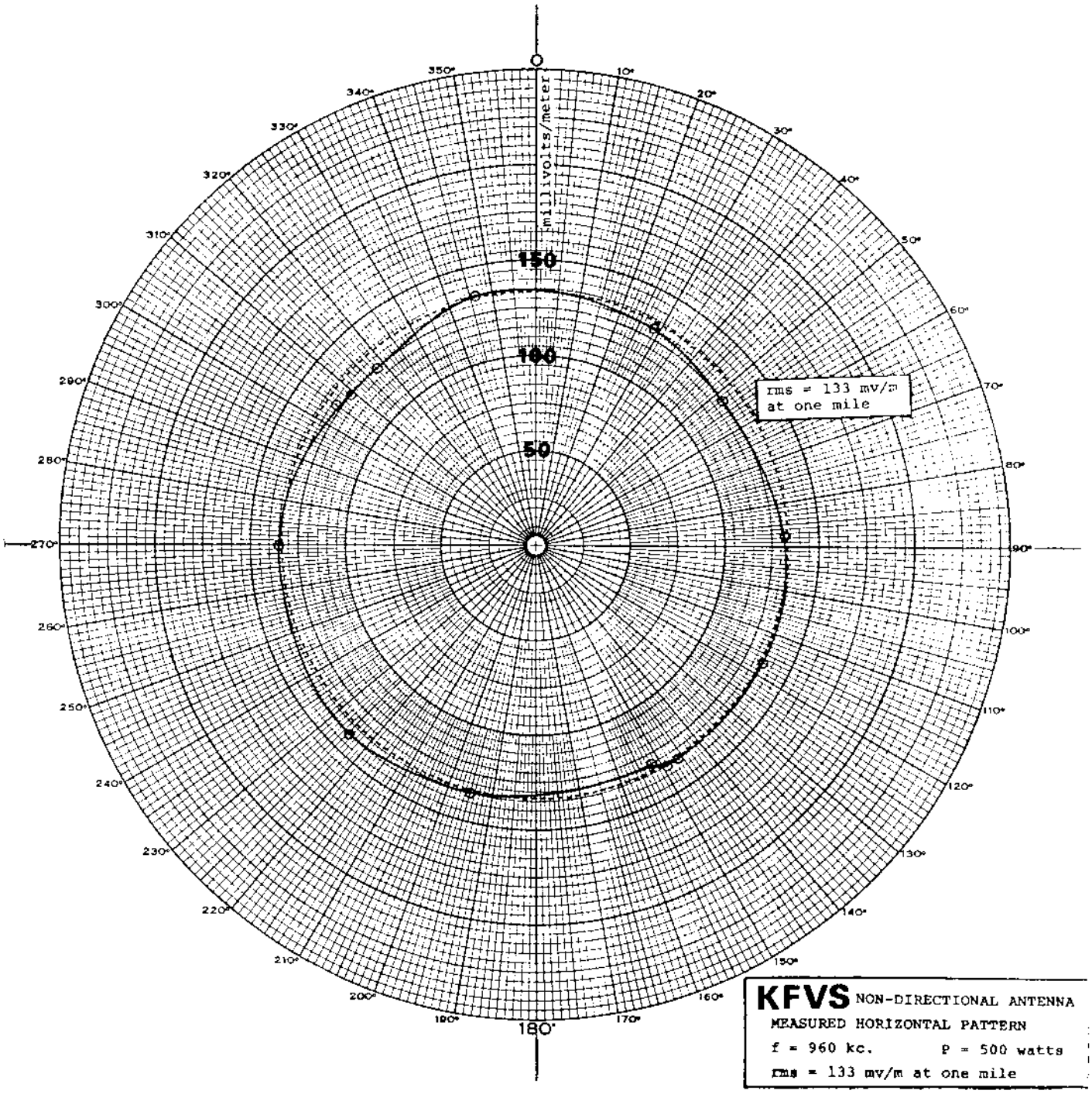
960 kc

KGIK ~~KFVS~~

Measured Non-DA
(10-28-68ct)

Station KFVS
Cape Girardeau, Missouri

530w,5kw-LS,DA-N,U
960 kc



FCC File No.BZ-6970
Accepted 10-25-68

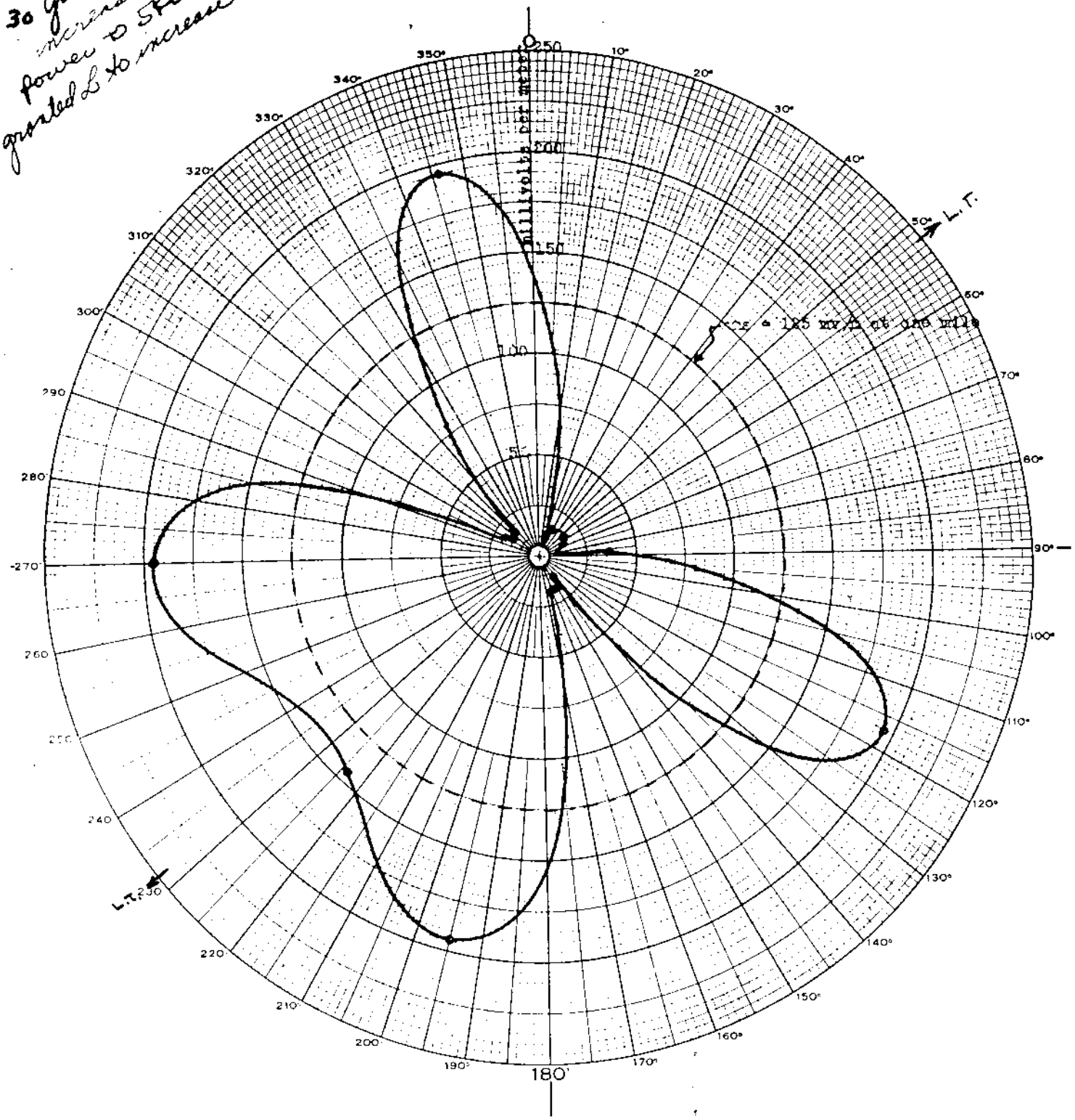
Station KFVS
Cape Girardeau, Missouri

960 kc

KGIK ~~KIVS~~
960

30 granted CP to increase day (ND) power to 5kw - 6-5-61
3-62 - granted L to increase ND power.

9/8/48G



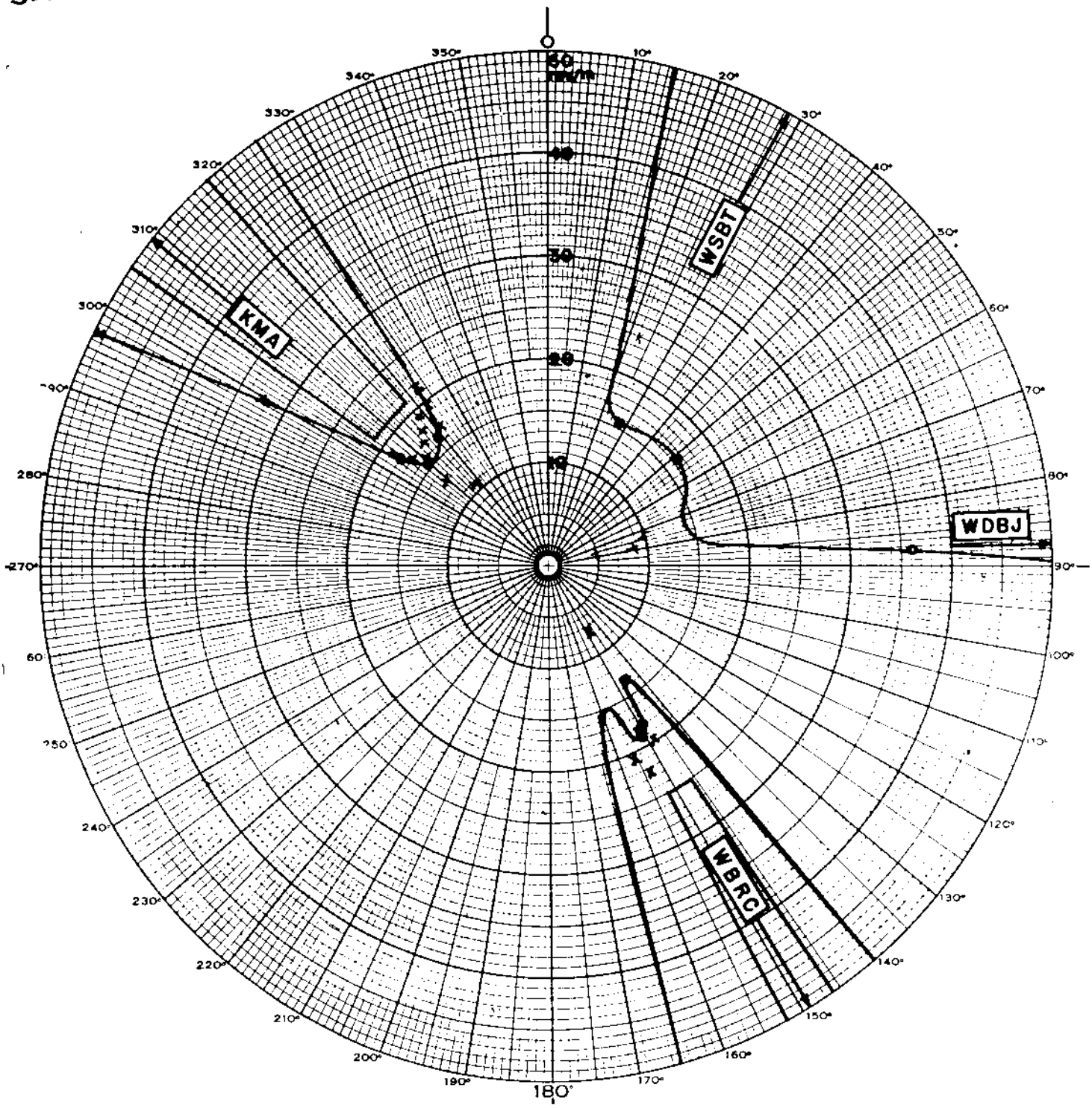
KFVS Directional Antenna
Measured Horizontal pattern
f= 960 kc
P= 500 watts
rms= 125 mv/m at 1 mile.

CAPE GIRARDEAU

9/7/48G

KGIR ~~KFVS~~
960

32



o Directional Antenna Measurements
x Non-Directional Measurements converted by directional non-directional ratio measurements.

K F V S Directional Antenna
Expanded horizontal plane pattern.
f= 960 kc.
P= 500 watts.
rms= 125 mv/m at 1 mile.

CAPE GIRARDEAU, MO.

KGIR ~~KFVS~~

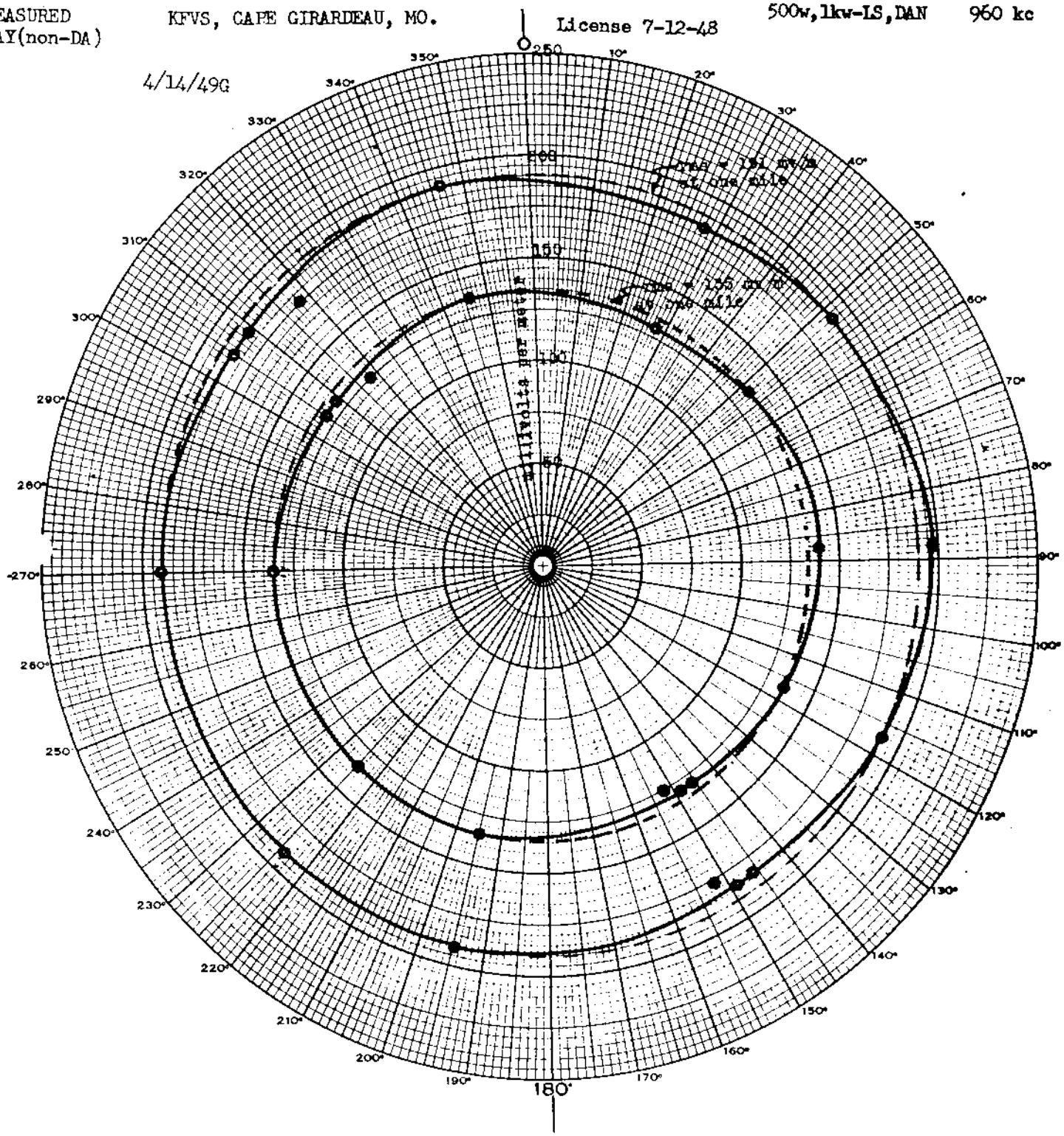
MEASURED
DAY(non-DA)

KFVS, CAPE GIRARDEAU, MO.

License 7-12-48

500w,1kw-LS,DAN 960 kc

4/14/49G



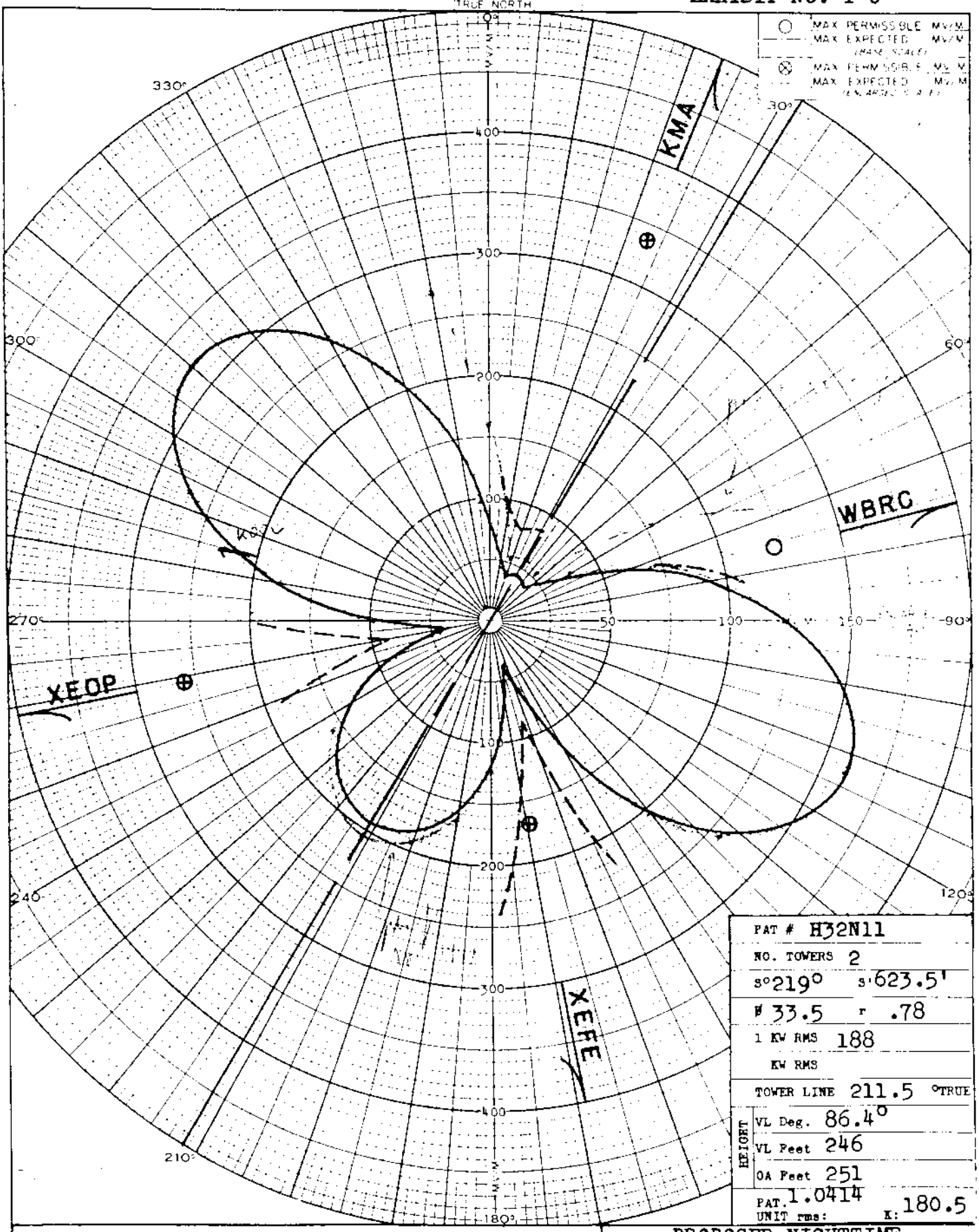
SITE: 37° 19' 10" N
89° 28' 40" W

K F V S Non-Directional Antenna
Measured horizontal pattern.
f= 960 kc.
P= 1 kw (daytime)
rms= 191 mv/m at one mile
P= 500 watts
rms= 135 mv/m at one mile

KFVS, Cape Girardeau, Mo. 960 kc

KGKL 960

EXHIBIT NO. I-C



PAT #	H32N11
NO. TOWERS	2
S° 219°	S' 623.5'
ø 33.5	r .78
1 KW RMS	188
KW RMS	
TOWER LINE	211.5 °TRUE
HEIGHT VL Deg.	86.4°
HEIGHT VL Feet	246
HEIGHT OA Feet	251
PAT. UNIT rms:	1.0414
K:	180.5

COMMERCIAL RADIO EQUIPMENT CO.

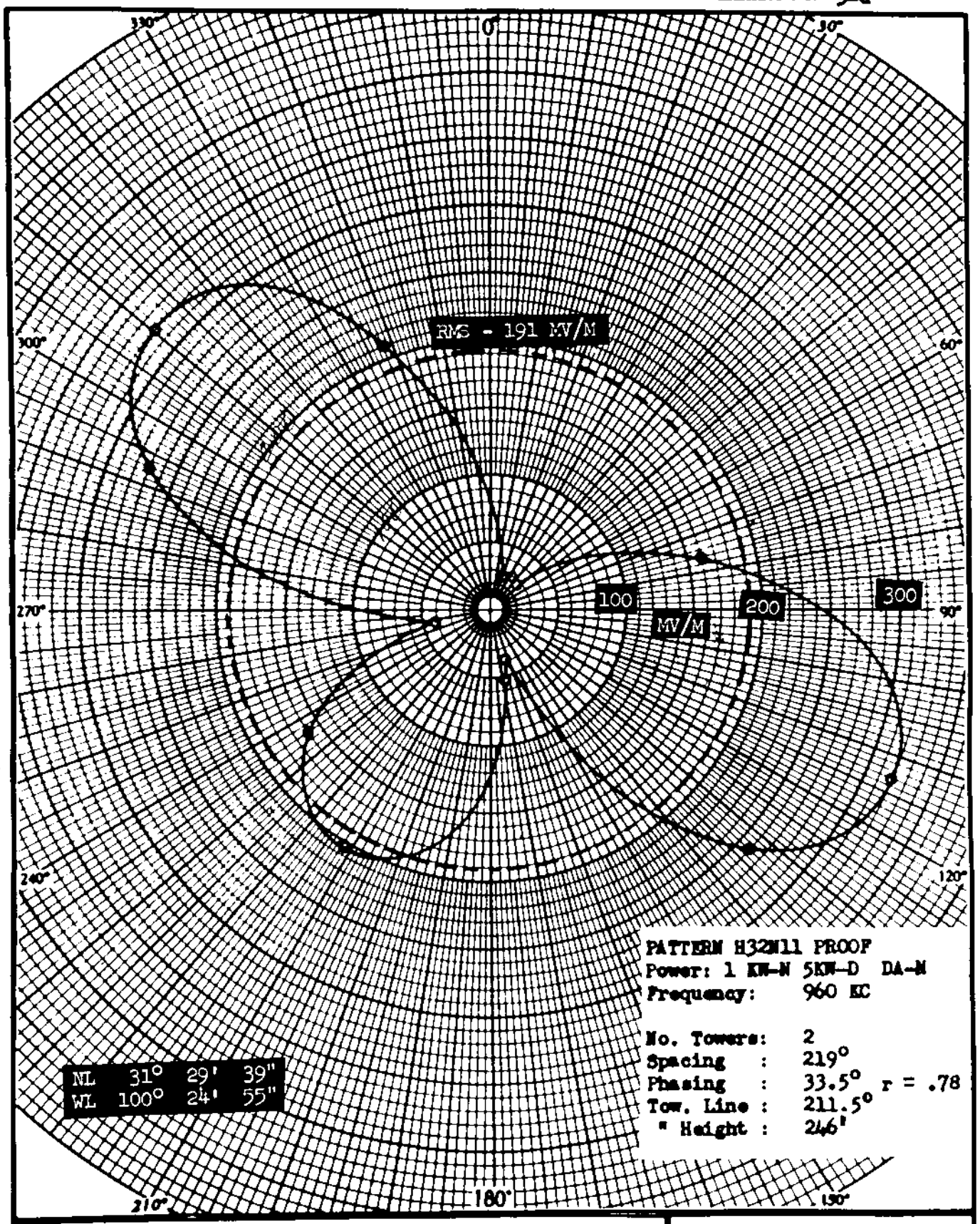
RADIO ENGINEERING CONSULTANTS

KANSAS CITY WASHINGTON, D.C. HOLLYWOOD

PATTERN	PROPOSED NIGHTTIME
FOR	KGKL, SAN ANGELO, TEXAS
POWER	1 KW
FREQ	960 KC
DATE	1/31/46
BY	ELD

MEASURED NIGHT | Station KGKL San Angelo, Texas | 1kw,5kw-LS, DA-N,U 960 KC

EXHIBIT NO. 3-d



COMMERCIAL RADIO EQUIPMENT CO.

Consulting Radio Engineers

KANSAS CITY WASHINGTON D C HOLLYWOOD

FOR: SAN ANGELO, TEXAS

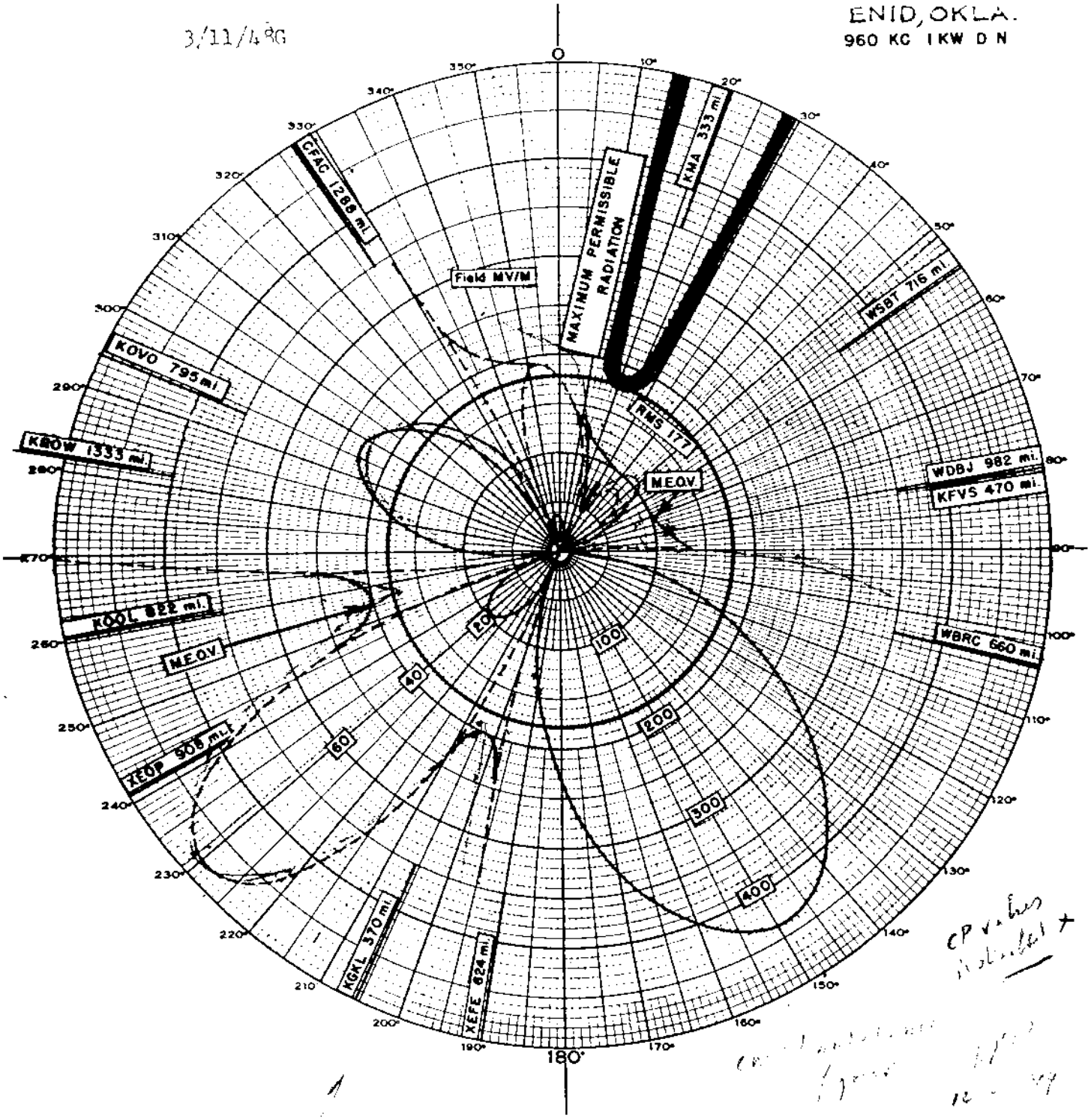
DATE: June 4 '47 BY: KMH

6

KGWA

ENID, OKLA.
960 KC 1 KW D N

3/11/48G



cp values included +

PUBLIC BROADCASTING SERVICE INC. ENID, OKLAHOMA		Figure 1 Series 4802130
		960 KC 1000 WATTS DAY-NIGHT
N 3 1.2/116° 2 1.0° 4 1.2/0° 1 1.0° 22.5° SPACING 1-2 = 200° 3-4 = 200° 1-4 = 90° 2-3 = 90° H = 90°	PROPOSED DIRECTIONAL ANTENNA PATTERN	FRANK H. McINTOSH *Consulting Radio Engineer* Washington, D.C.

Rec'd. 2-26-48 Amendment To BP-5821

KGWA

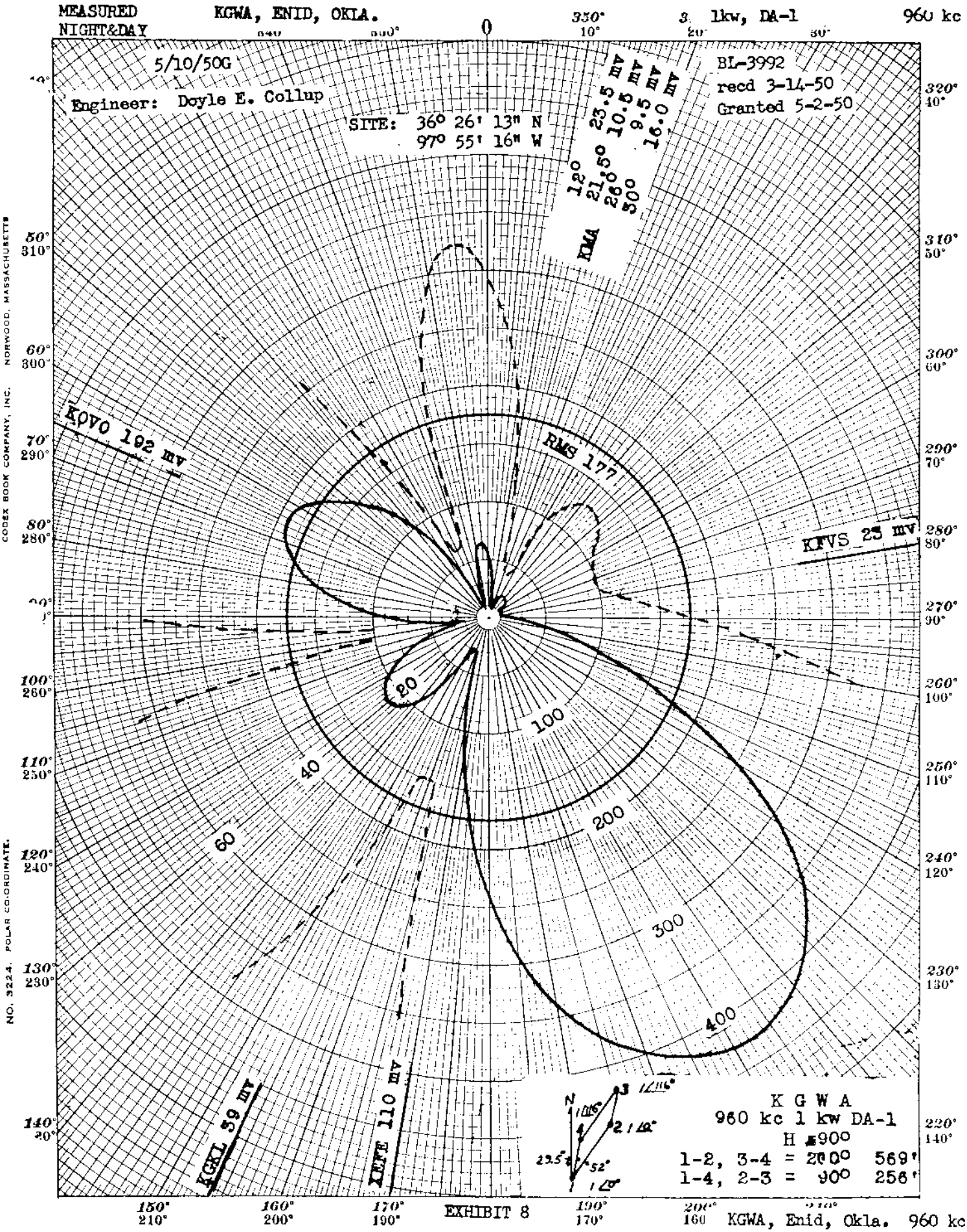


EXHIBIT 8

KGWA, Enid, Okla. 960 kc

KLAD

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KLAD

Main Studio: Klamath Falls, Oregon

Frequency: 960 kHz

Power: 5kw

Notification List No. 1773

Date March 29, 1978 Class: III

GEOGRAPHICAL LOCATION OF THE CENTERS
OF THE DAYTIME AND NIGHTTIME ANTENNA SYSTEMS:

DAYTIME	NIGHTTIME
42° 11' 38" North Latitude	42° 09' 43" North Latitude
121° 22' 27" West Longitude	121° 39' 02" West Longitude

NIGHTTIME ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 4
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWERS:	W (#4)	(#3)	(#2)	E (#1)
HEIGHT ABOVE INSULATORS:	260'	260'	260'	260' (91.2°)
PHASING:	-45	-255°	+255°	+45°
FIELD RATIO:	1.0	2.8	2.8	1.0

SPACING AND ORIENTATION: Adjacent towers in a row are spaced 228' (80°) on a line bearing 301° true.

GROUND SYSTEM: 120-256' equally spaced copper radials plus 120-50' interspaced radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers.

DAYTIME ANTENNA CHARACTERISTICS

Authorized to Daytime operation (ND)
Height above insulators: 320' (112.4°)
Ground System: 120-175' equally spaced copper radials about the towers.

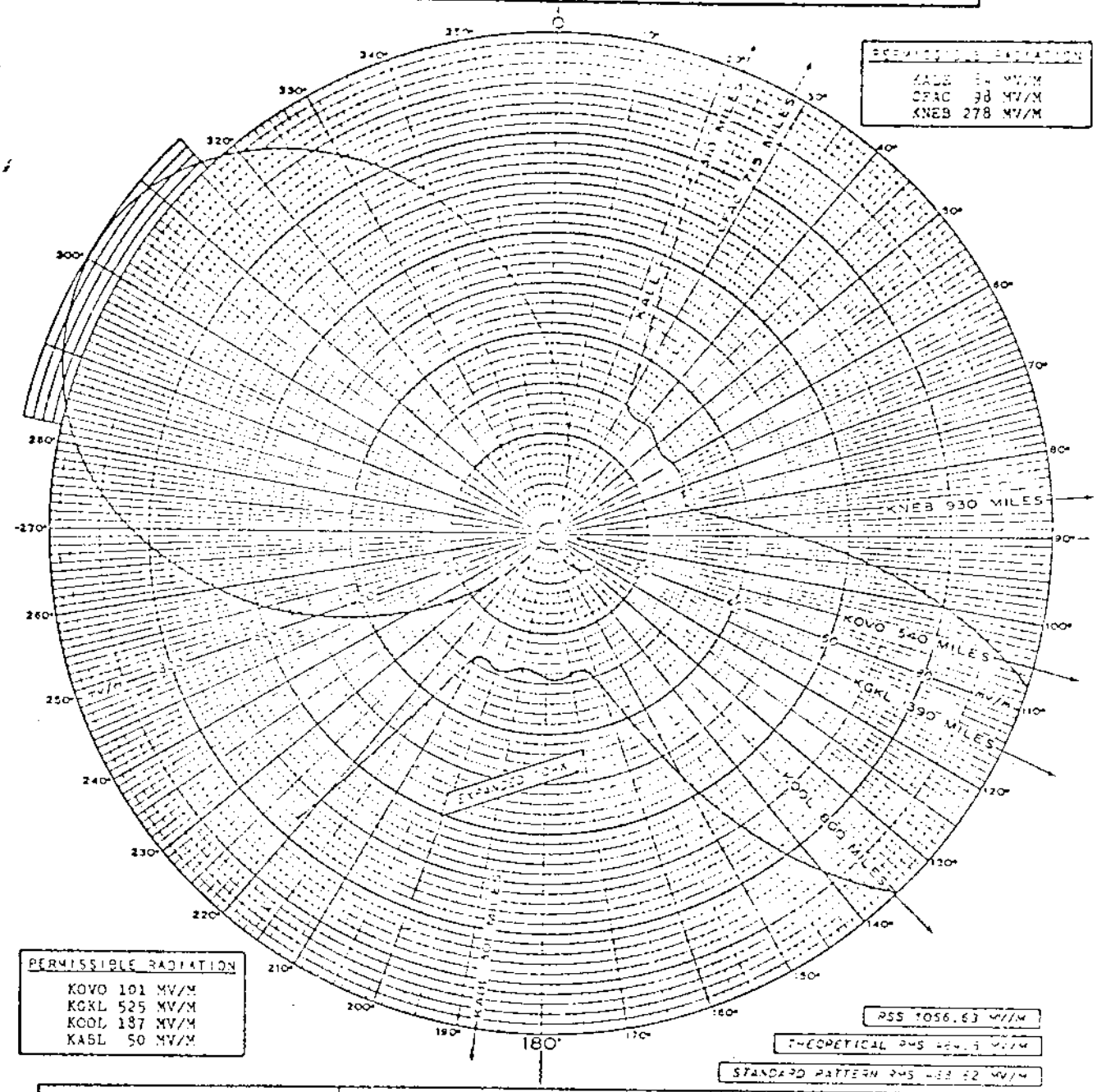
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	416 mv/m	—	—
Night	464.60 mv/m	1056.63 mv/m	488.62 mv/m

Note: This notification concerns only a change to add new nighttime operation with Daytime operation continued as previously notified.

STANDARD HORIZONTAL PLANE PATTERN, NIGHTTIME

KLAD



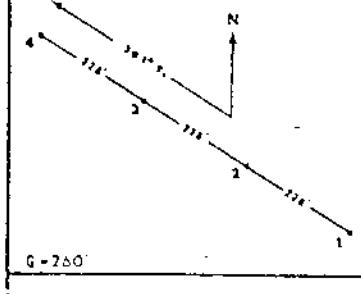
PERMISSIBLE RADIATION
KOVO 101 MV/M
KGKL 525 MV/M
KOOL 187 MV/M
KASL 50 MV/M

PSS 1056.63 MV/M

THEORETICAL RMS [illegible] MV/M

STANDARD PATTERN RMS [illegible] 52 MV/M

TOWER PLACEMENT SKETCH



PATTERN PARAMETERS

TOWER No.	ELECTRICAL HEIGHT	TOWER ORIENTATION	SPACING	PHASING	HORIZONTAL FIELD RATIO	ELEV ANGLE	ELEVATION RMS FIELD
1	91.2	33	3	25	1.5	3	
2	91.2	33	3	25	1.5	3	
3	91.2	33	3	25	1.5	3	
4	91.2	33	242	25	1.5	3	
5							
6							
7							
8							
9							
10							

STATION DATA

CALL	KLAD
FREQUENCY	960 kc
POWER	5 kw
TIME OF OPERATION	DAYTIME
TIME OF OPERATION	[illegible]
DAYTIME TOWERS	
NIGHTTIME TOWERS	4
[illegible]	
[illegible]	
[illegible]	
[illegible]	
[illegible]	
[illegible]	
[illegible]	
SUPERVISOR	
PATTERN No.	

GEORGE LYNCH, CONSULTING ENGINEER
MODESTO, CALIFORNIA

960 RADIO, INC. (KLAD)
KLAMATH FALLS, OREGON

FIGURE 4
Amended December 1973

* PROPOSED AMENDED OPERATION, 5 KW U DA-N (PRESENT OPERATION 5 KW ND-D) SEPTEMBER 1973 *

KMA

granted CP to replace tower
granted LP (10-2-59)
for changes in Daytime 7-18-61

PROPOSED NIGHT
(9-4-59g)

Station KMA
Shenandoah, Iowa

5kw, DA-N,U
960 KC

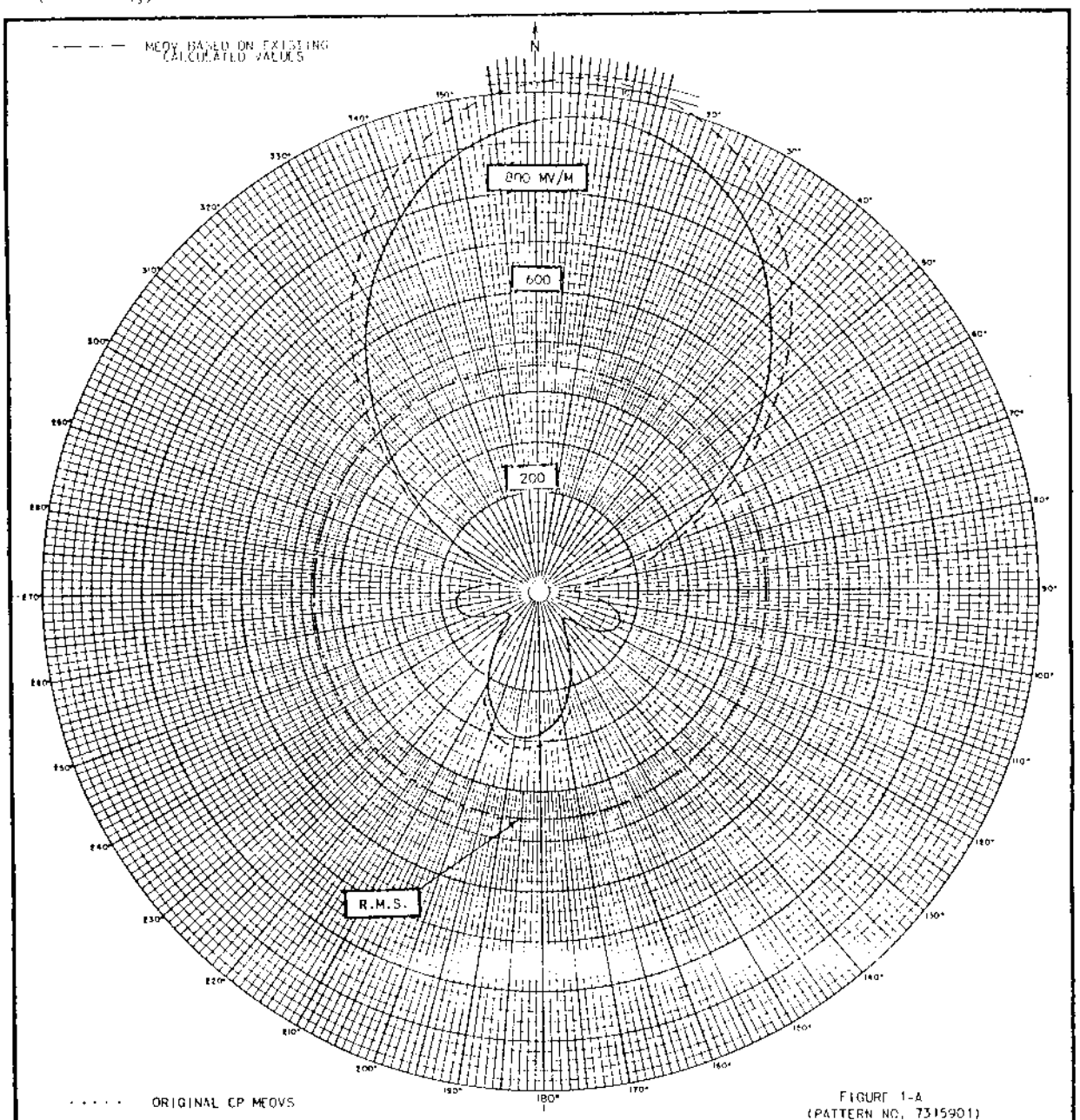
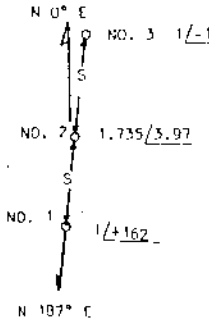


FIGURE 1-A
(PATTERN NO. 7315901)

HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION



S = 199' = 69.89°

$G_1 = G_3 = 84.29°$ TOP LOADED

$G_2 = 168.59°$

APPLICANT	KMA
LOCATION	SHENANDOAH, IOWA
FREQUENCY	960 KC/S
POWER	5 KW
NL	40° 46' 48"
WL	95° 21' 23"
WHEN USED	NITES
R.M.S. FIELD	454.14
DATE	JULY 1959

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BP-13317
Accepted 8-17-59

KMA
Shenandoah, Iowa

960 KC

KMA

PROPOSED NIGHT NULLS
(9-4-59g)

Station KMA
Shenandoah, Iowa

5kw, DA-N,U
960 KC

Granted OPWO replace this volume (10-6-59)
Granted LP for changes in Target. 1-18-61

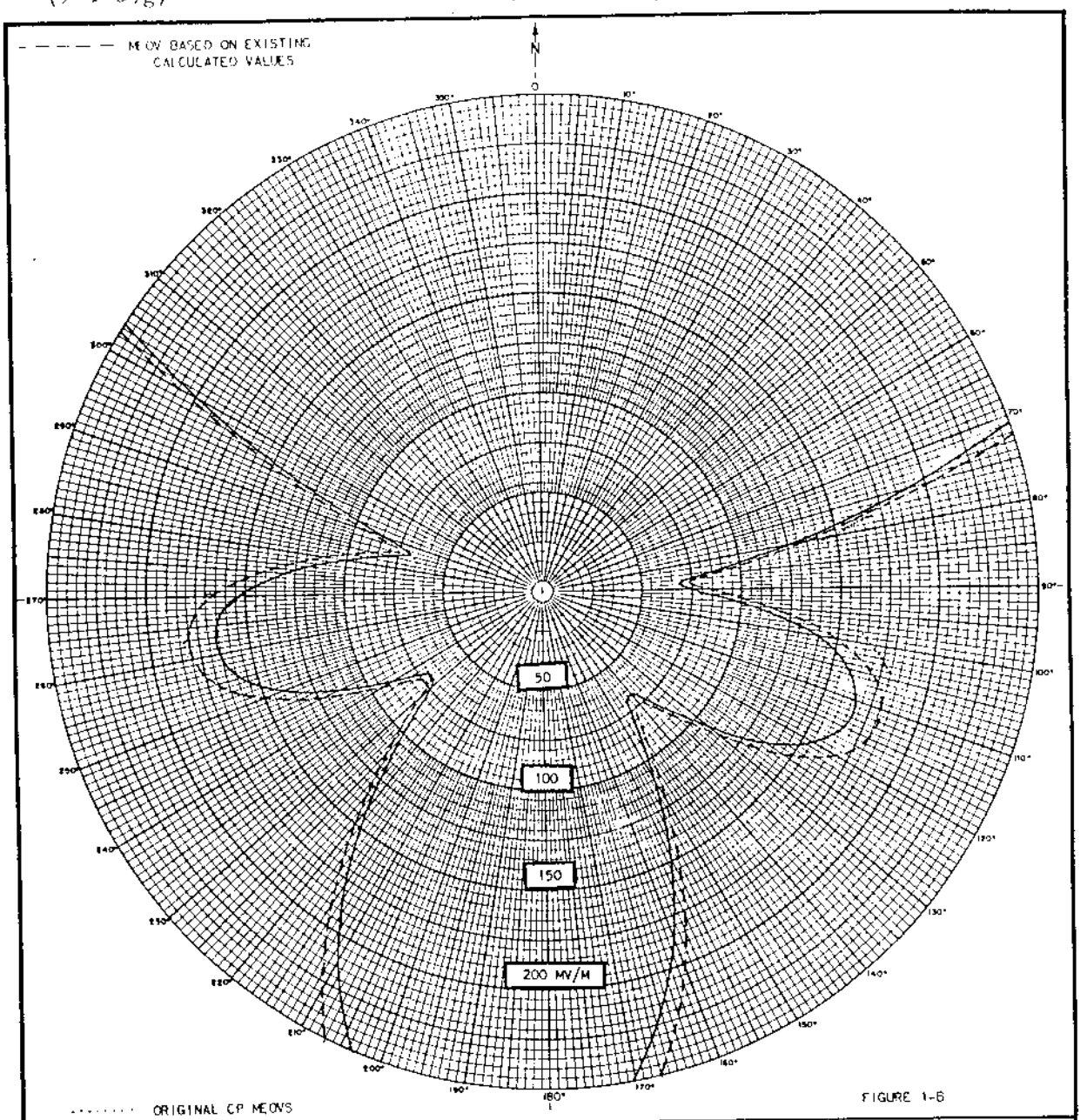


FIGURE 1-6

HORIZONTAL RADIATION PATTERN

EXPANDED VIEW

APPLICANT : KMA
LOCATION : SHENANDOAH, IOWA
FREQUENCY : 960 KC/S
POWER : 5 KW
NL 40° 46' 48"
WL 95° 21' 23"
WHEN USED : NITES
R.M.S. FIELD : 454.14 MV/M
DATE : JULY 1959

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BP-13317
Accepted 8-17-59

KMA
Shenandoah, Iowa

960 KC

MEASURED NIGHT
(3-8-61g)

Station KMA
Shenandoah, Iowa

5kw, DA-N,U
960 KC

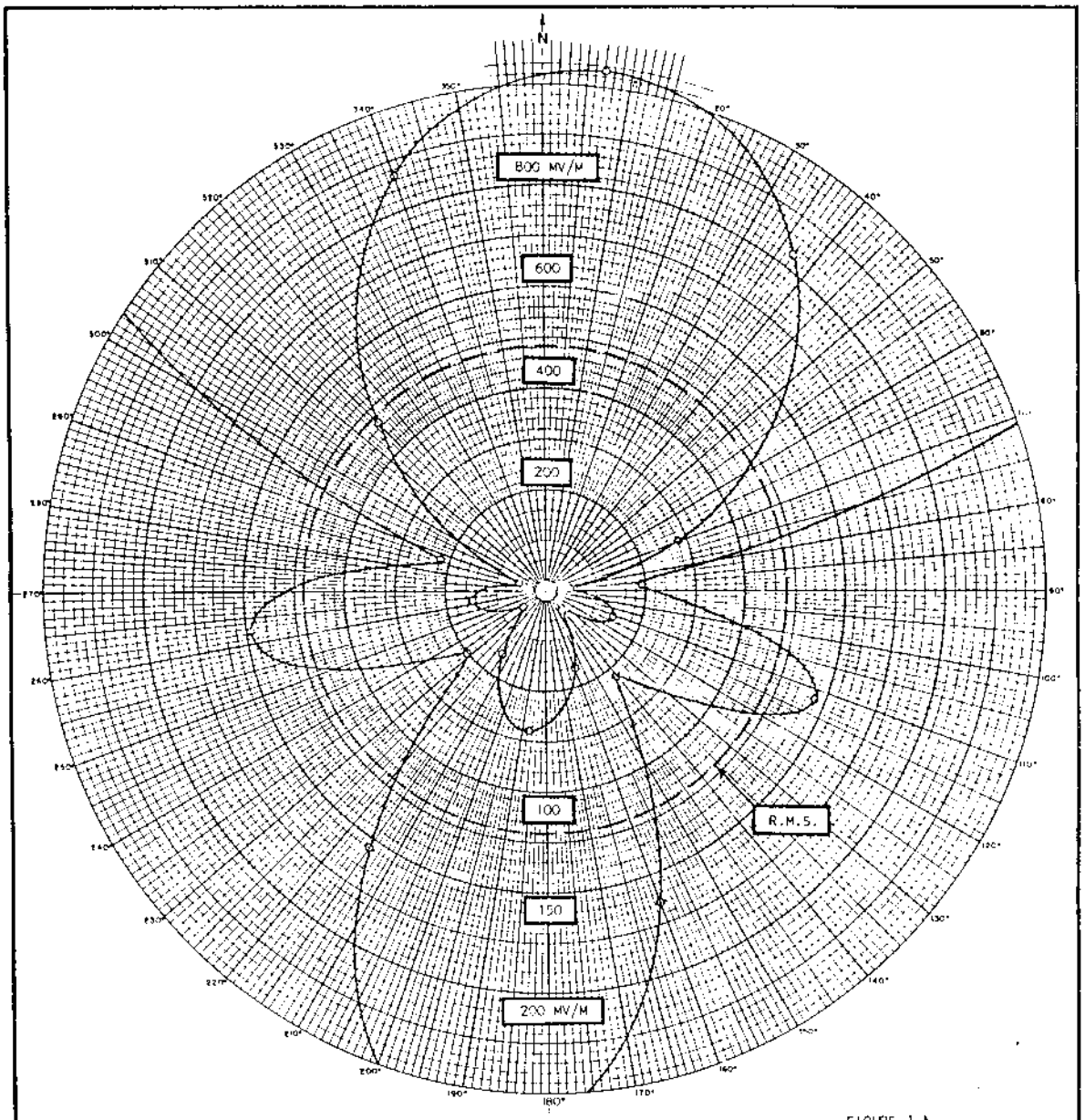
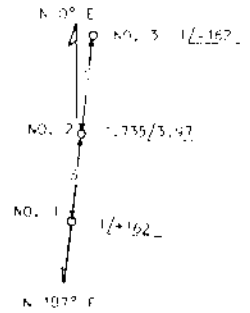


FIGURE 1-A

HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION



S = 191° = 62.83°

G_1 = GS = 84.23° TOP LOADED

G_2 = 168.53°

APPLICANT	KMA
LOCATION	SHENANDOAH, IOWA
FREQUENCY	960 KC/S
POWER	5 KW
LATITUDE	40 DEG 45 MIN 48 SEC
LONGITUDE	95 DEG 21 MIN 23 SEC
WHEN USED	NIGHTTIME
RMS FIELD	483.2 MV/M
DATE	DECEMBER 1960

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-8229
Accepted 2-23-61

KMA
Shenandoah, Iowa

960 KC

MEASURED NON-DA
(3-8-61g)

Station KMA
Shenandoah, Iowa

5kw, DA-N,U
960 KC

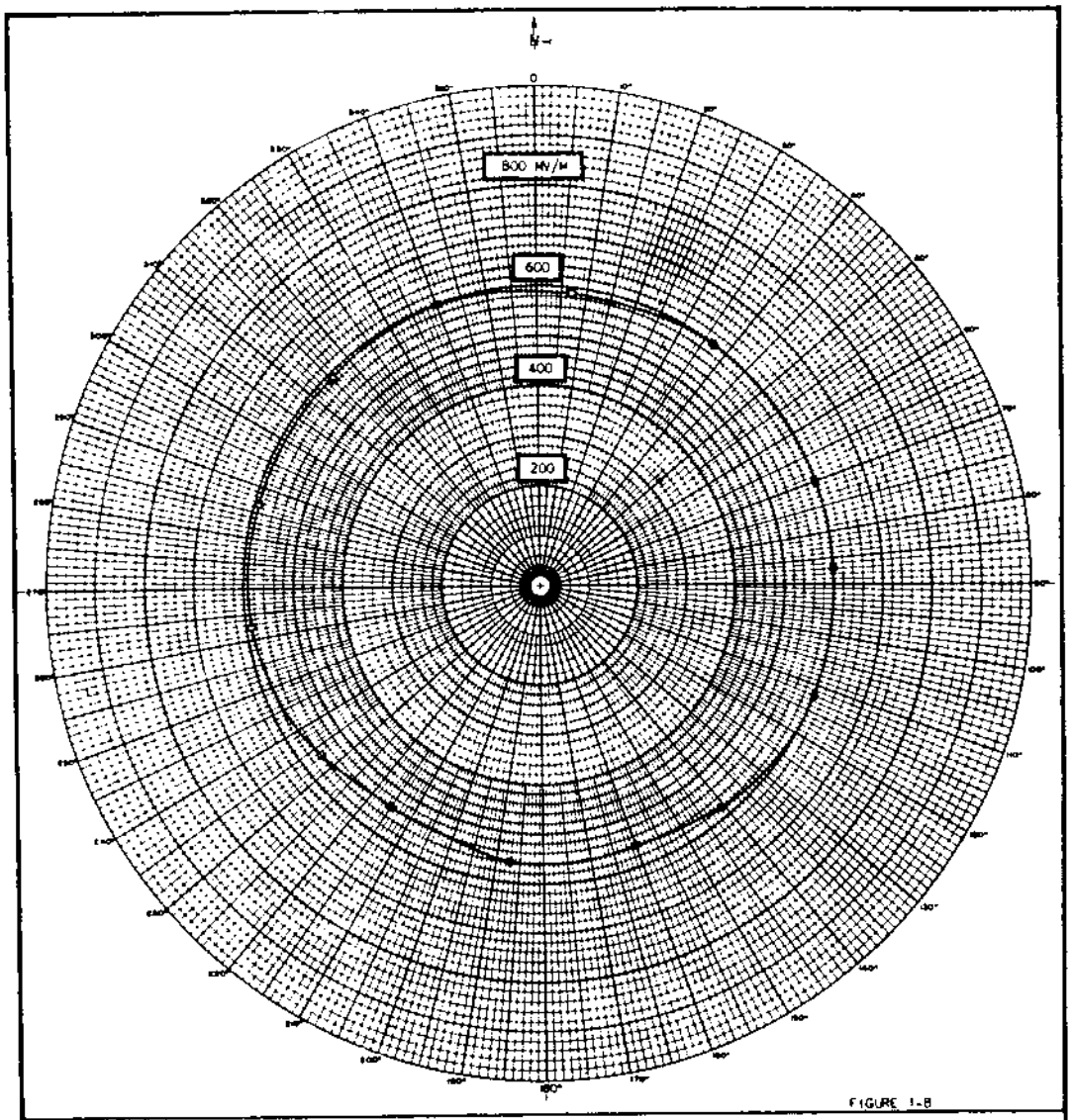


FIGURE 1-B

HORIZONTAL RADIATION PATTERN

NON-DIRECTIONAL SURVEY

APPLICANT	KMA
LOCATION	SHENANDOAH, IOWA
FREQUENCY	960 KC/S
POWER	5 KW
LATITUDE	40 DEG 46 MIN 48 SEC
LONGITUDE	95 DEG 21 MIN 23 SEC
WHEN USED	DAYTIME
R M S FIELD	579.6 MV/M
DATE	DECEMBER 1960

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

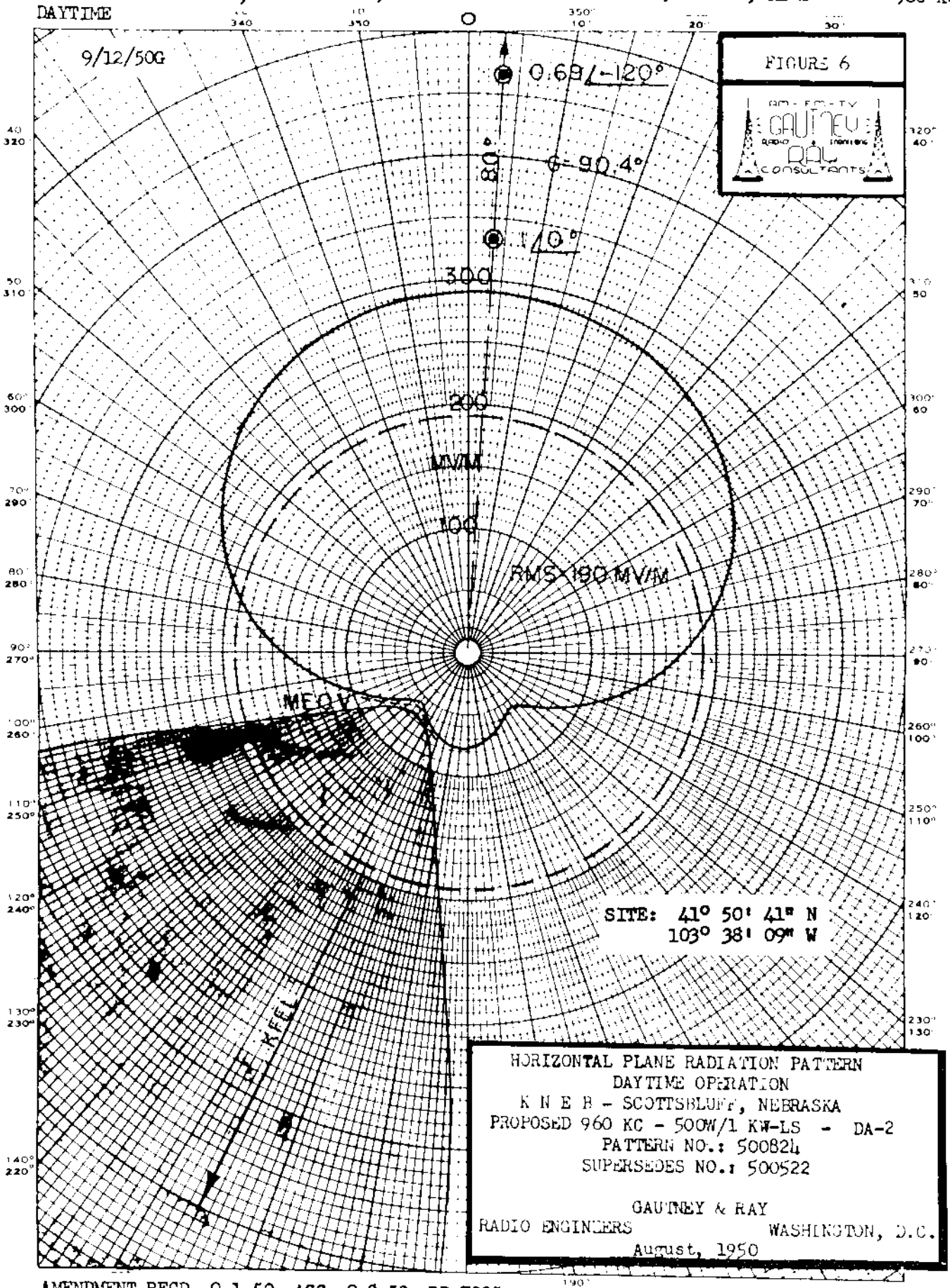
FCC File No. BL-8229
Accepted 2-23-61

KMA
Shenandoah, Iowa

960 KC

KNEB

PROPOSED DAYTIME KNEB, SCOTTSBLUFF, NEBR. 500w, 1kw-LS, DA-2 960 kc



AMENDMENT RECD. 9-1-50 ACC. 9-8-50 BP-7035 KNEB, Scottsbluff, Nebr. 960 kc

KNEB

MEASURED DAY — KNEB, SCOTTSBLUFF, NEB. — 500w, 1kw-LS, DA-2 — 960 kc

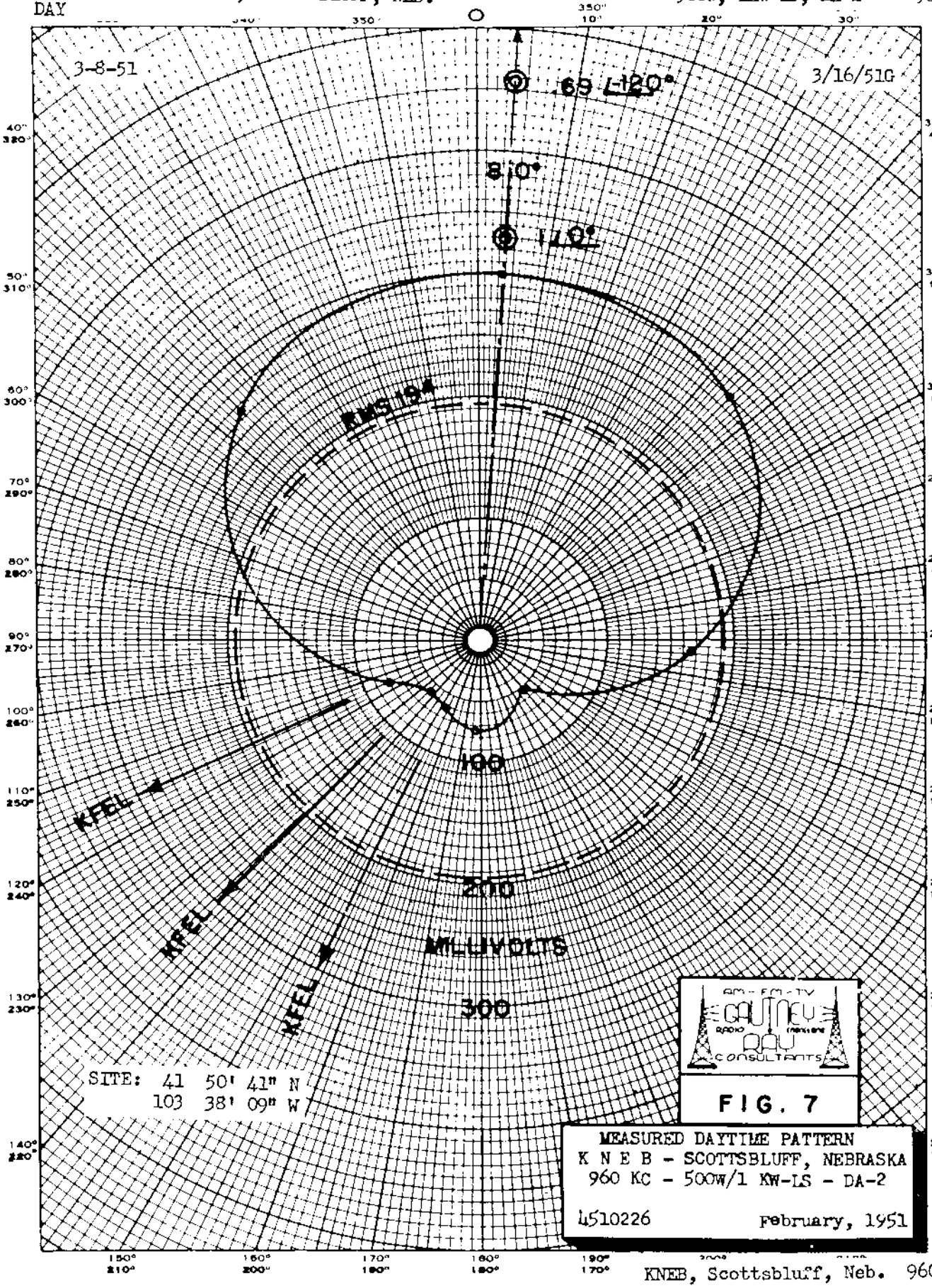


FIG. 7

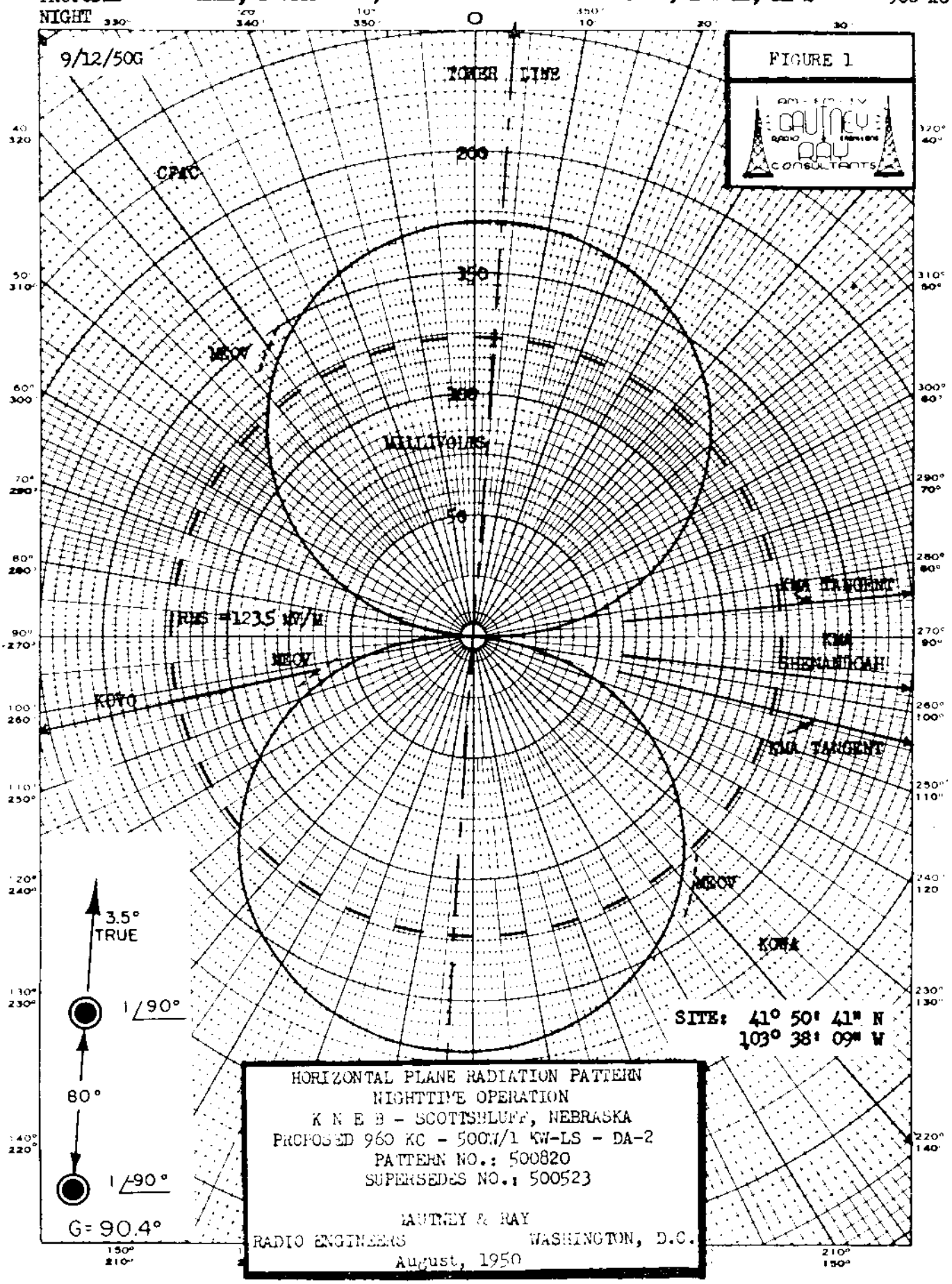
MEASURED DAYTIME PATTERN
K N E B - SCOTTSBLUFF, NEBRASKA
960 KC - 500W/1 KW-LS - DA-2

4510226 February, 1951

KNEB, Scottsbluff, Neb. 960 kc

KNEE

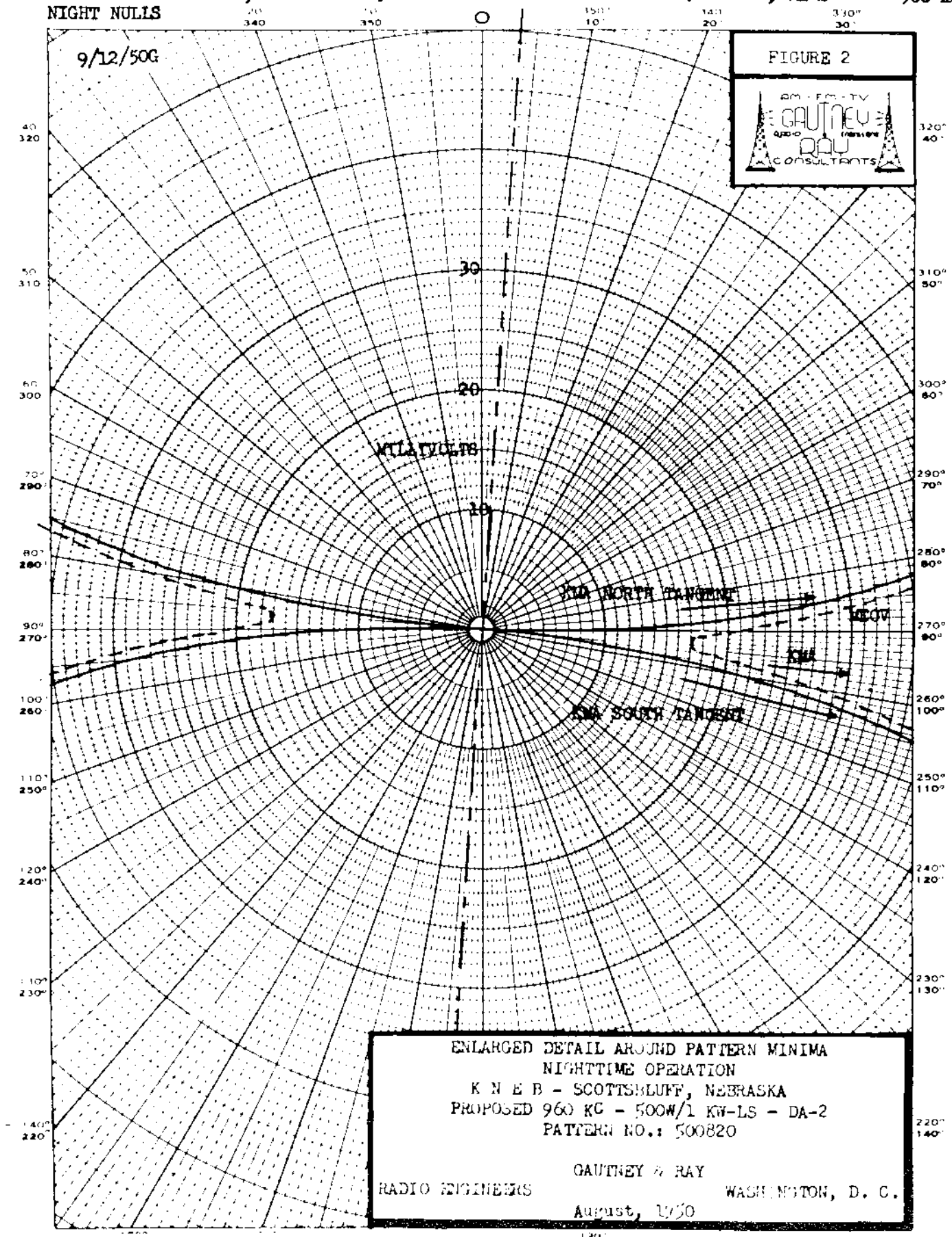
PROPOSED NIGHT KNEB, SCOTTSBLUFF, NEBR. 500w, 1kw-LS, DA-2 960 kc



AMENDMENT RECD. 9-1-50 ACC. 9-8-50 BP-7035 KNEB, Scottsbluff, Nebr. 960 k

KNEB

PROPOSED NIGHT NULLS — KNEB, SCOTTSBLUFF, NEBR. — 500w, 1kw-LS, DA-2 — 960 kc



AMENDMENT RECD. 9-1-50 ACC. 9-8-50 BP-7035 — KNEB, Scottsbluff, Nebr. 960 kc

KNEB

MEASURED NIGHT — KNEB, SCOTTSBLUFF, NEB. — 500w, 1kw-LS, DA-2 — 960 kc

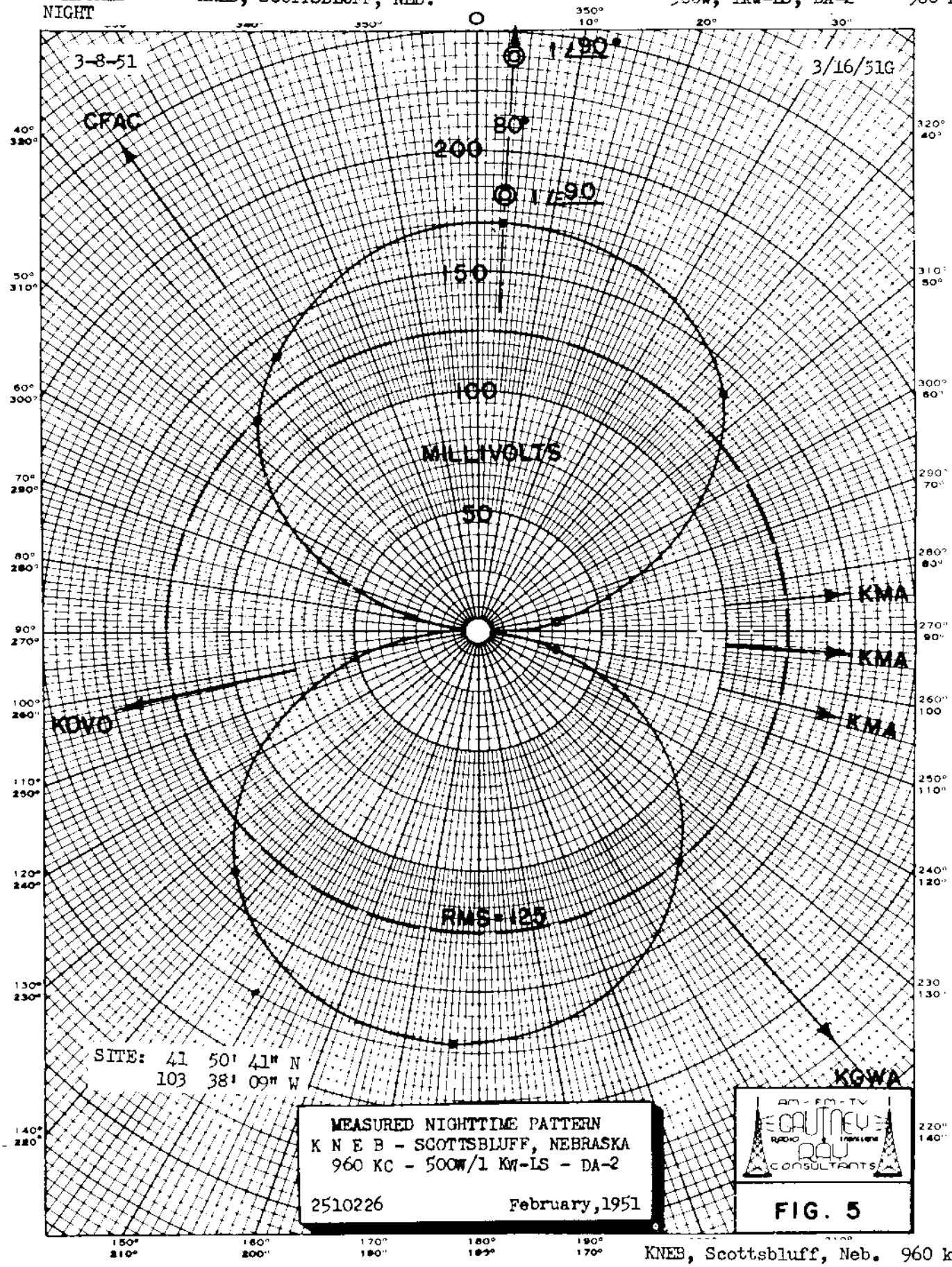


FIG. 5

KNEB, Scottsbluff, Neb. 960 kc

KNEB

MEASURED NIGHT NULLS — KNEB, SCOTTSBLUFF, NEB. — 500w, 1kw-LS, DA-2 — 960 kc

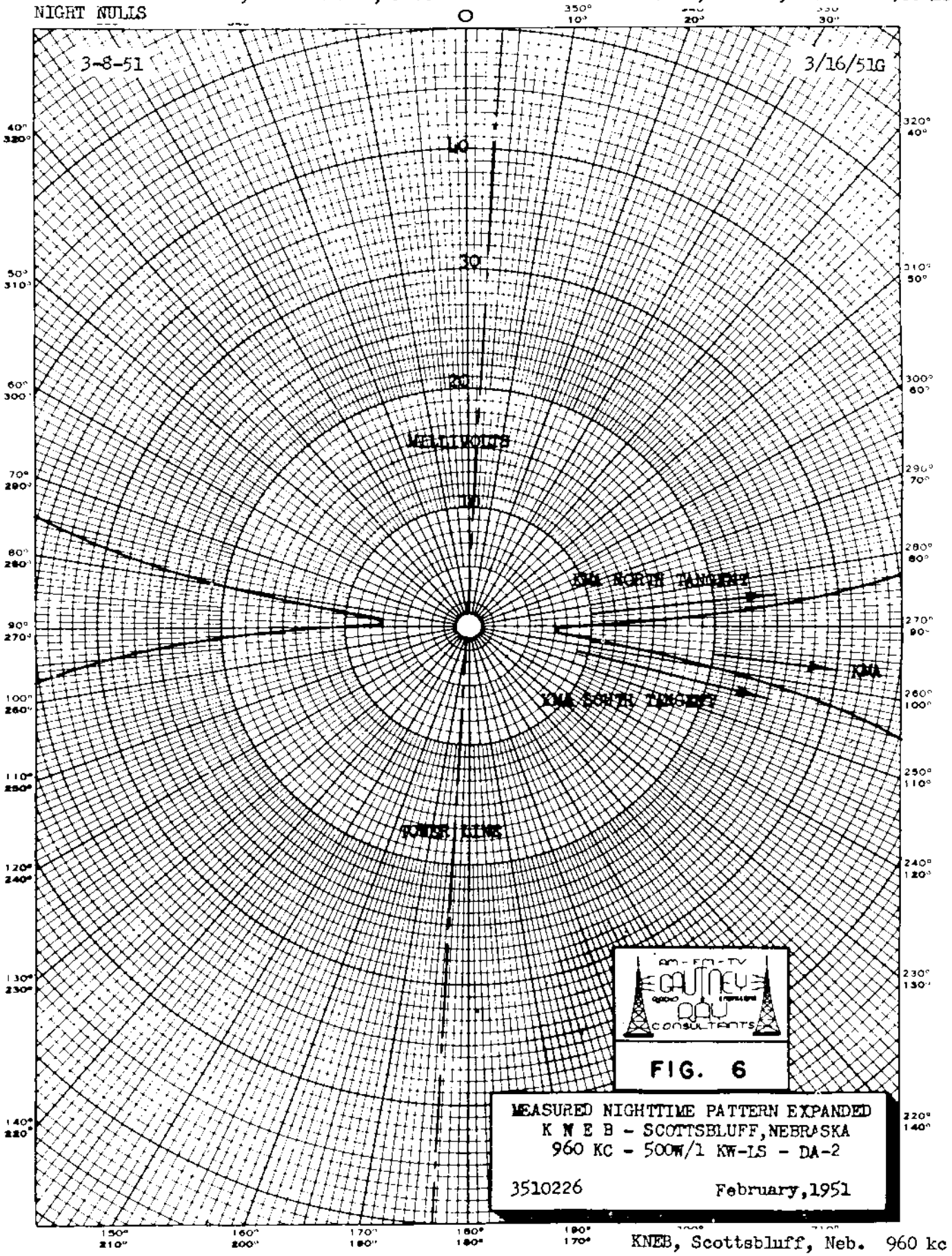


FIG. 6

MEASURED NIGHTTIME PATTERN EXPANDED
K N E B - SCOTTSBLUFF, NEBRASKA
960 KC - 500W/1 KW-LS - DA-2

3510226 February, 1951

KNEB, Scottsbluff, Neb. 960 kc

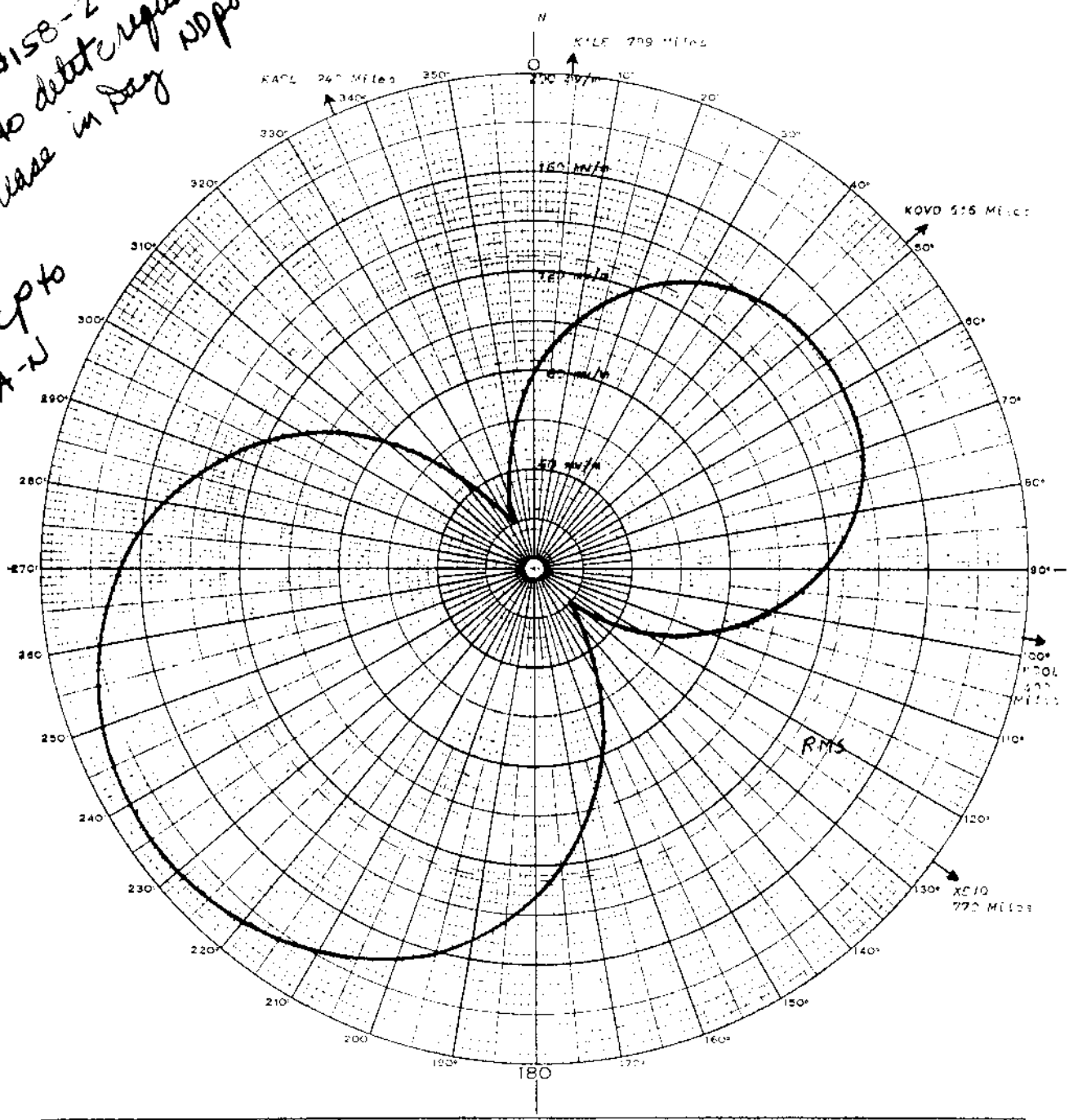
KNEZ

#158-2-17-61
Amend to delete request for increase in Day NDP
-5-61 United cp to install DA-N

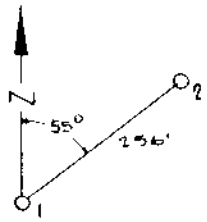
PROPOSED NIGHT
(8-12-60g)

Station KNEZ
Lompoc, California

500w, ~~-1kw-LS~~, DA-N,U
960 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	STATION DATA



TOWER No.	ELECTRICAL HEIGHT °	TRUE TOWER ORIENTATION °	SPACING '	PHASING °	HORIZONTAL FIELD mv/m	FIELD RATIO	ELEV ANGLE °	ELEVATION RMS FIELD mv/m
1	50	0	0	0	110	1	0	127
2	85	55	20	155	131	1.18	10	
3							20	
4							30	
5							40	
6							50	
7							60	
8							70	
9							80	

STATION DATA:
CALL KNEZ
FREQUENCY 960 KC
POWER (night) 0.5 kw
TIME OF OPERATION U
TYPE OF OPERATION DA-N
DAYTIME TOWERS 1
NIGHTTIME TOWERS 2
NIGHTTIME TOWER SPACE 120
DAYTIME TOWER SPACE 250
34 38 46
120 30 37

Thomas D. Frierson
Consulting Radio Engineer

PCC File No. BP-12569
Accepted 8-12-60 (Amended)

KNEZ
Lompoc, California

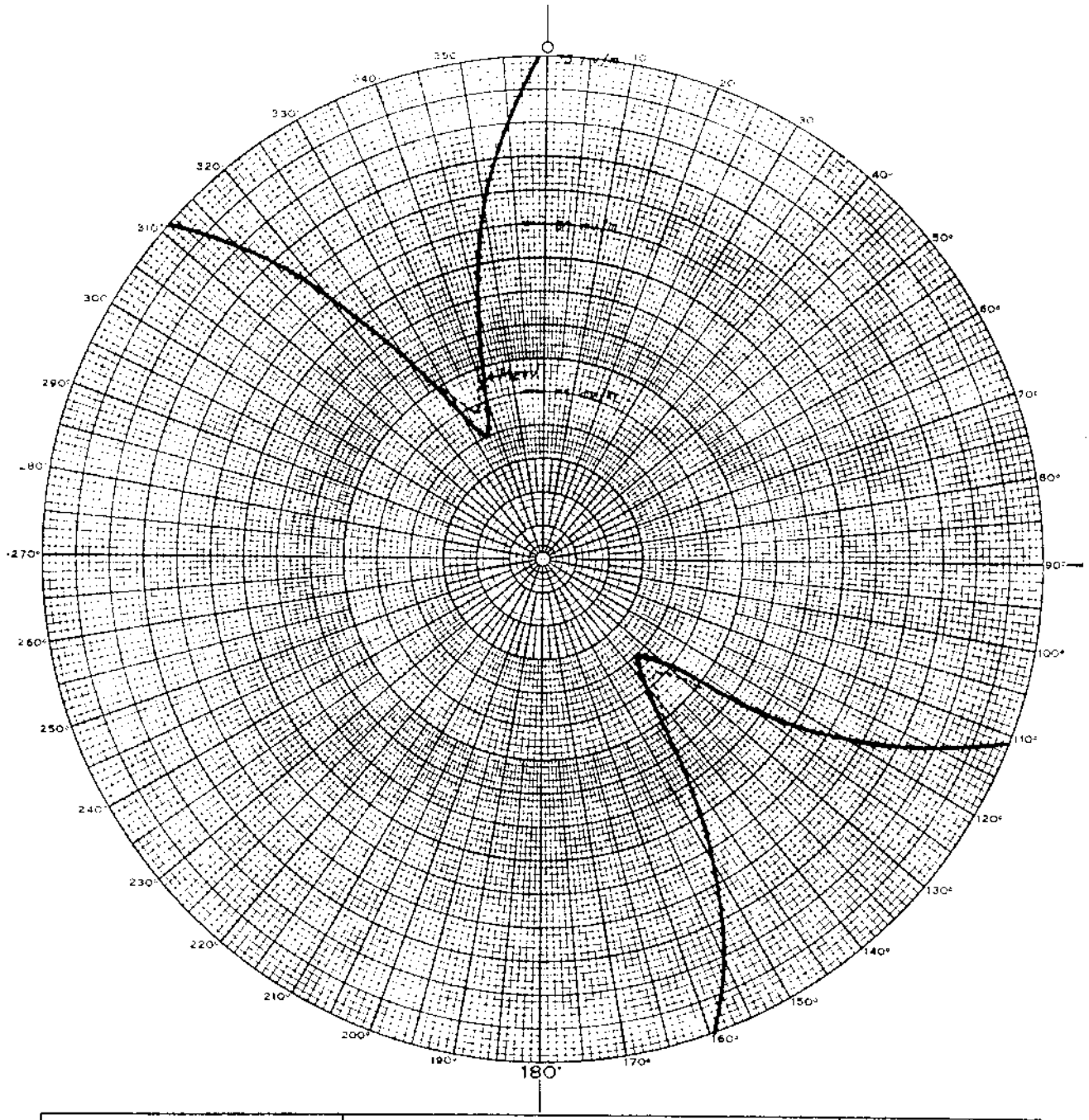
960 KC

KNEZ

PROPOSED NIGHT NULLS
(8-29-60g)

Station KNEZ
Lompoc, California

500w, 1kw-LS, DA-N, U
960 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS								STATION DATA
	TOWER NO.	ELECTRICAL HEIGHT	TRUE TOWER ORIENTATION	SPACING	PHASING	HORIZONTAL FIELD	FIELD RATIO	ELEV. ANGLE	ELEVATION RMS FIELD
	1							0	CALL KNEZ
	2							10	FREQUENCY 960 KC
	3							20	POWER 0.5 KW
	4							30	TIME OF OPERATION U
	5							40	TYPE OF OPERATION DA-N
	6							50	DAYTIME TOWERS 1
	7							60	NIGHTTIME TOWERS 3
	8							70	NIGHTTIME POWER 1.00
	9							80	

[illegible]

[illegible]

KNEZ LOMPOC, [illegible]

[illegible]

Thomas H. [illegible]
Consulting Engineer

FCC File No. BP-12569
Accepted 8-12-60 (Amended)

KNEZ
Lompoc, California

960 KC

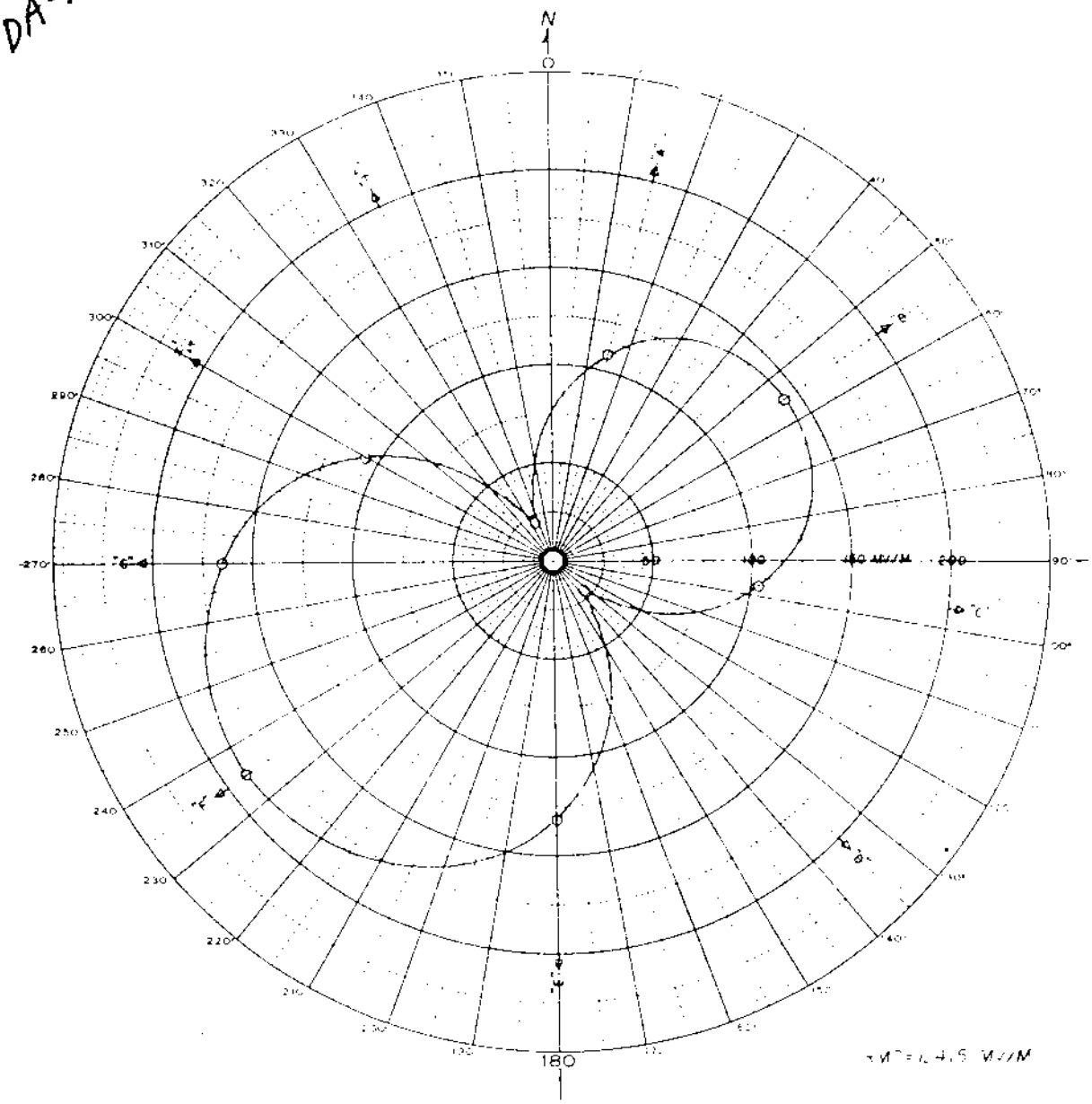
KNEZ

Measured Night
(9-27-62ct)

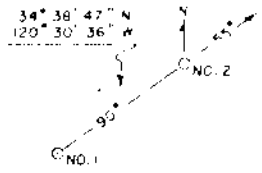
Station KNEZ
Lompoc, California

500w,DA-N,U
960 kc

1-25-63
granted L
on change in hours & DA-N



TOWER PLACEMENT SKETCH



NO. 1 = 1.0 0°
NO. 2 = 0.847 +165°

H NO. 1 = 60°
H NO. 2 = 85°

FIGURE NO. 12

NIGHT TIME DIRECTIONAL RADIATION PATTERN

BASED ON FIELD INTENSITY MEASUREMENTS

STATION KNEZ —— LOMPOC, CALIFORNIA

960 KC / 0.5 KW / DA-N

JUNE / 1962

FCC File No.BL-9511
Accepted 8-22-62

Station KNEZ
Lompoc, California

960 kc

11

KNEZ

Measured NOn-DA
(9-27-62ct)

Station KNEZ
Lompoc, California

500w,DA-N,U
960 kc

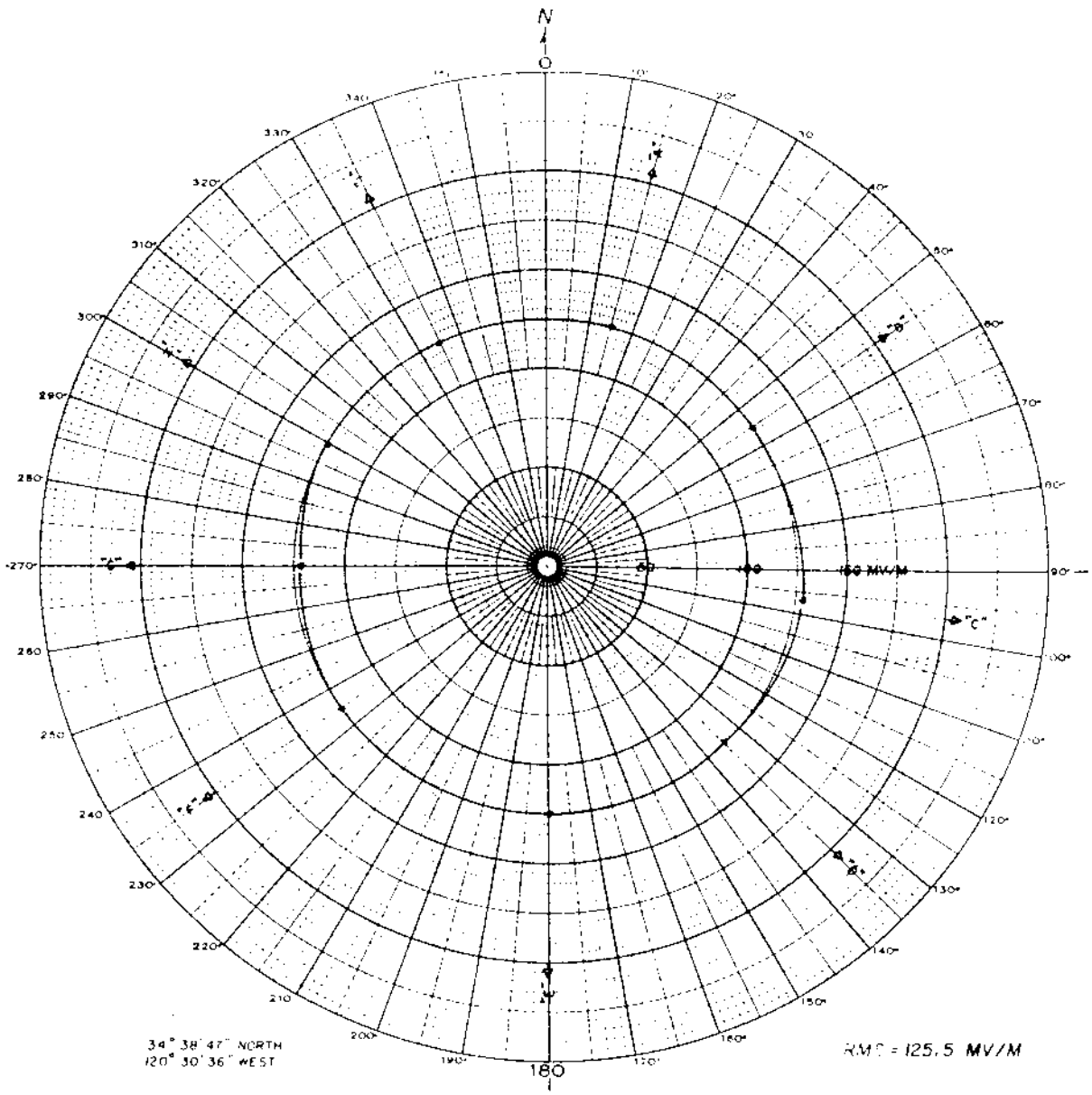


FIGURE NO. 11

NON-DIRECTIONAL RADIATION PATTERN

BASED ON FIELD INTENSITY MEASUREMENTS

960 KC 0.5 KW DA-N

STATION KNEZ — LOMPOC, CALIFORNIA

— JUNE 7 1962

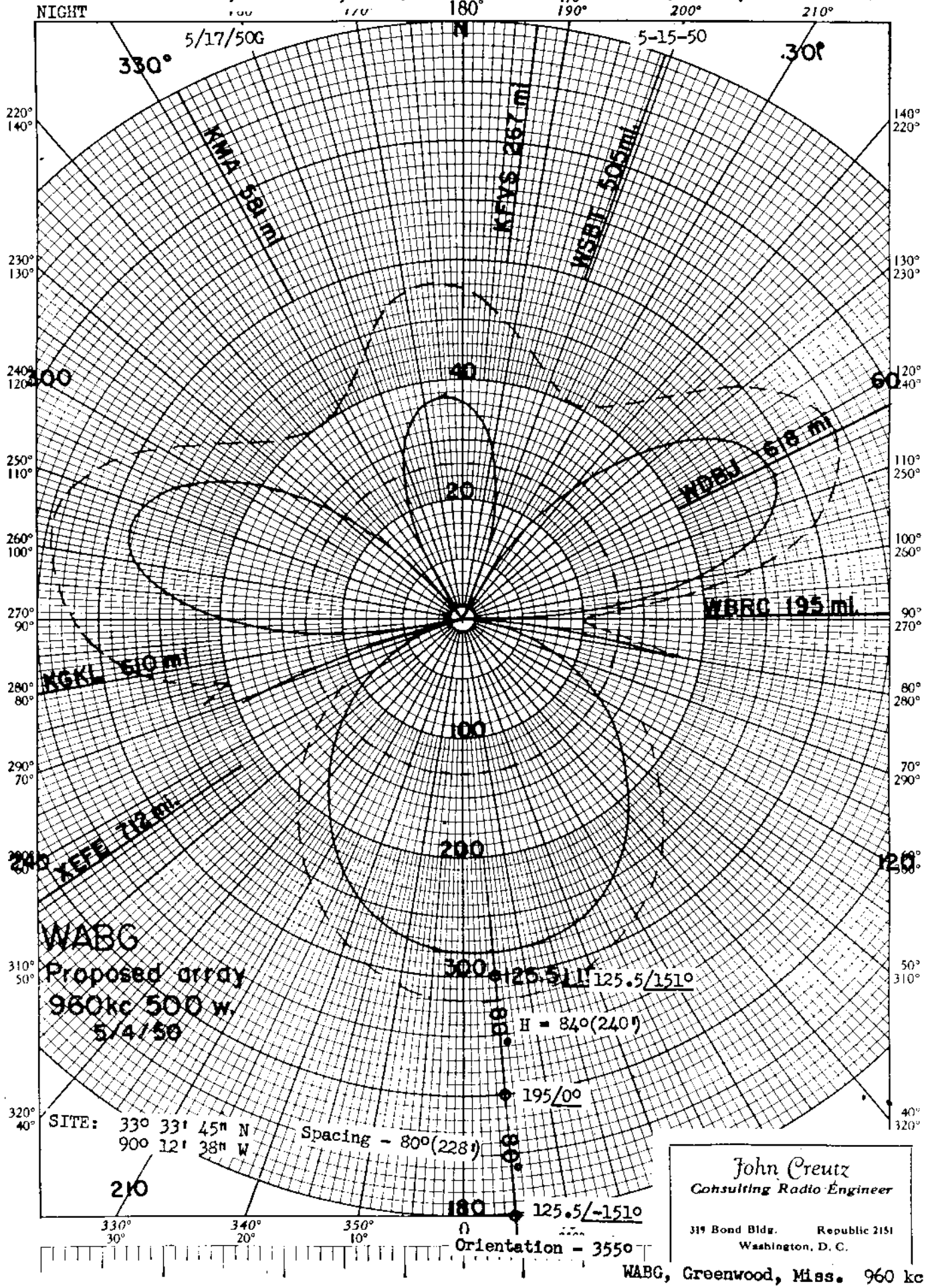
FCC File No.BL-9511
Accepted 8-22-62

Station KNEZ
Lompoc, California

960 kc

WABG

PROPOSED NIGHT — WABG, GREENWOOD, MISS. — 500w,1kw-LS,DAN — 960 kc



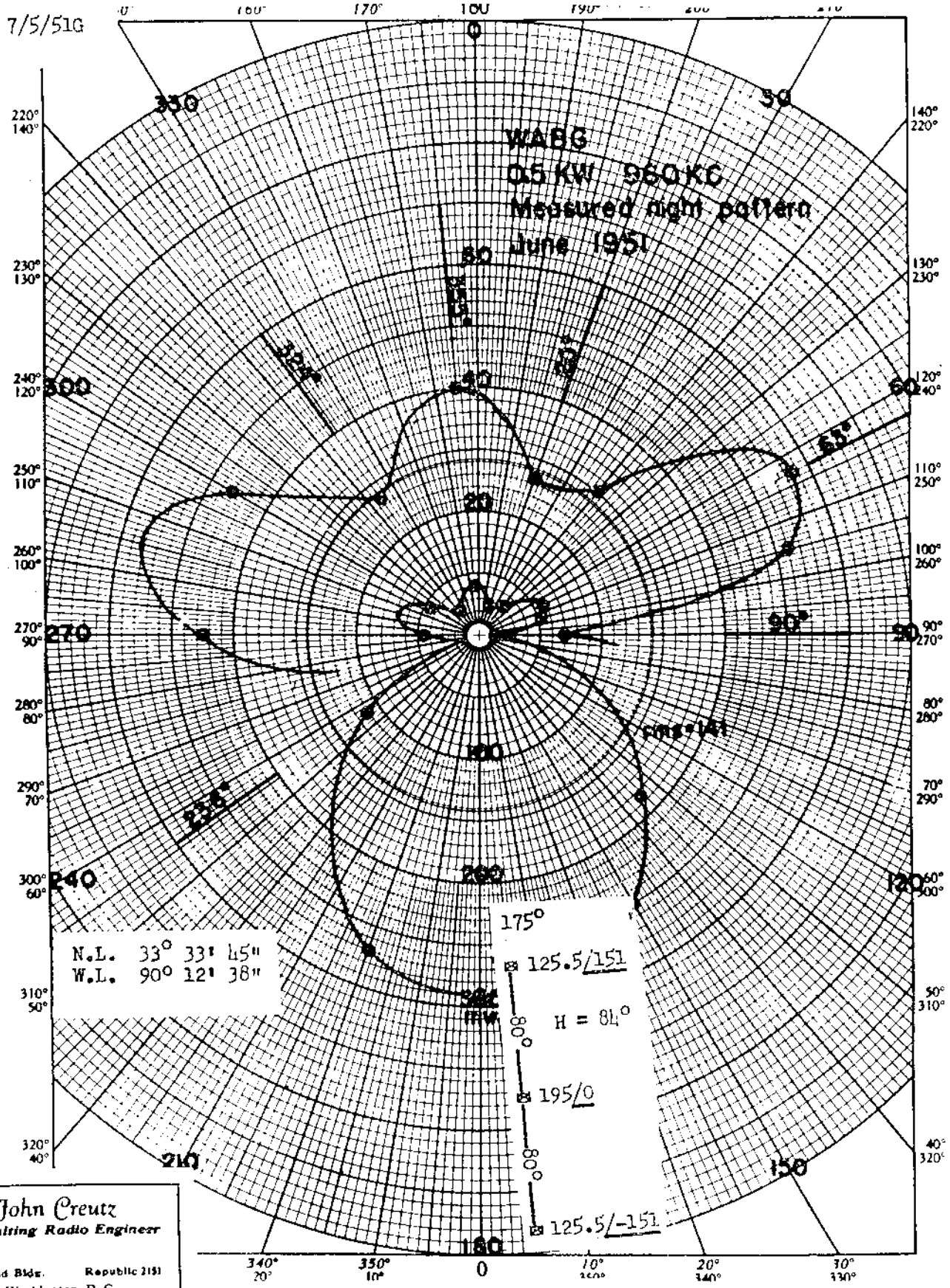
John Creutz
Consulting Radio Engineer
319 Bond Bldg. Republic 2151
Washington, D. C.

WABG, Greenwood, Miss. 960 kc

WABG

MEASURED
NIGHT WABG, GREENWOOD, MISSISSIPPI 500W, 1KW-LS, U, DA-N 960 KC

7/5/51G



John Creutz
Consulting Radio Engineer
319 Bond Bldg. Republic 2151
Washington, D. C.

APPL RECD 6/26/51

WABG, GREENWOOD, MISSISSIPPI, 960 KC

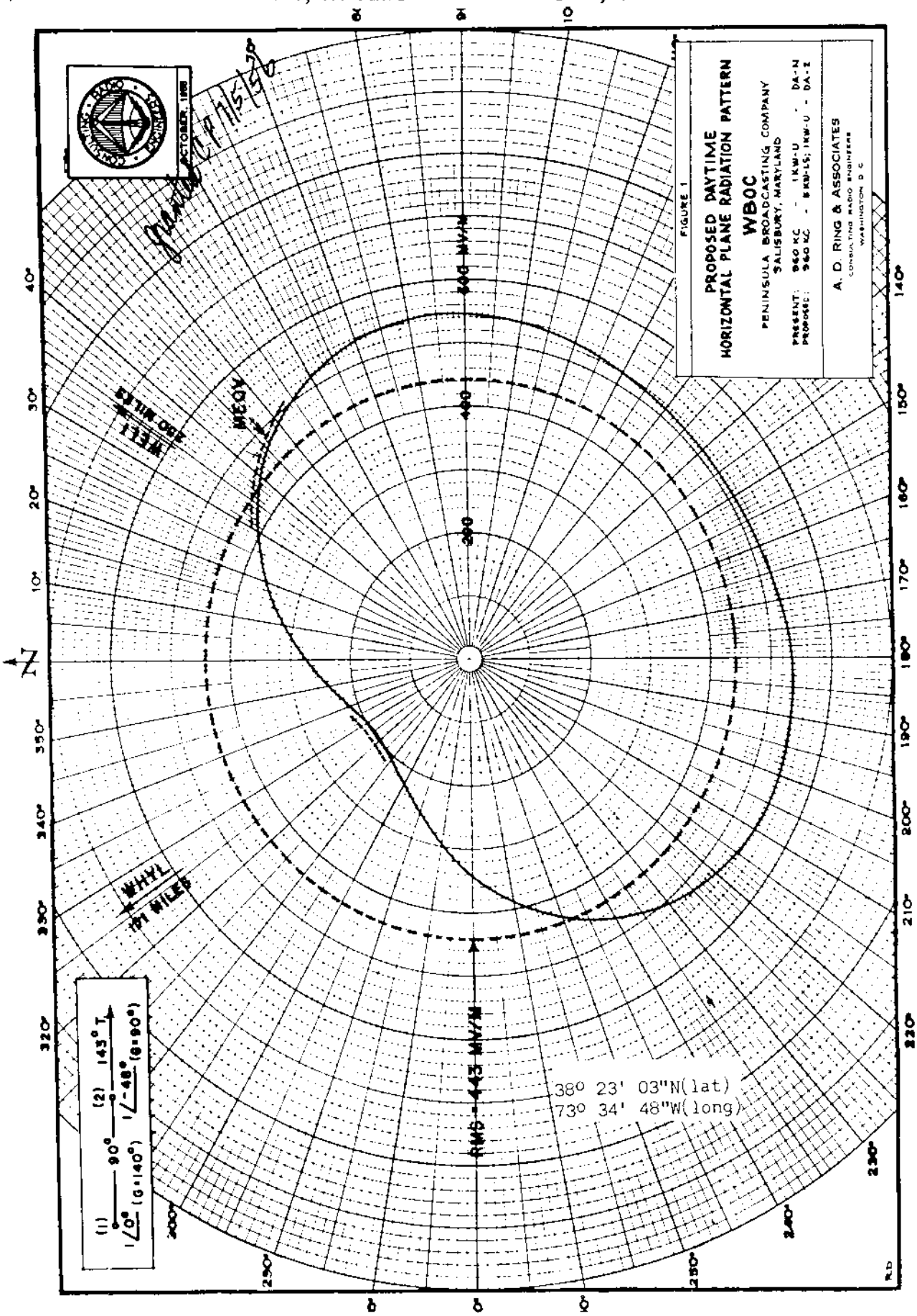
WBOC

PROPOSED DAY
(11-28-55G)

STATION WBOC
SALISBURY, MARYLAND

1KW, 5KW-LS
DA-2, U

960 KC



FILE NO. BP-10,187 ACCEPTED 11-15-55 FCC WBOC, Salisbury, Maryland 960 KC

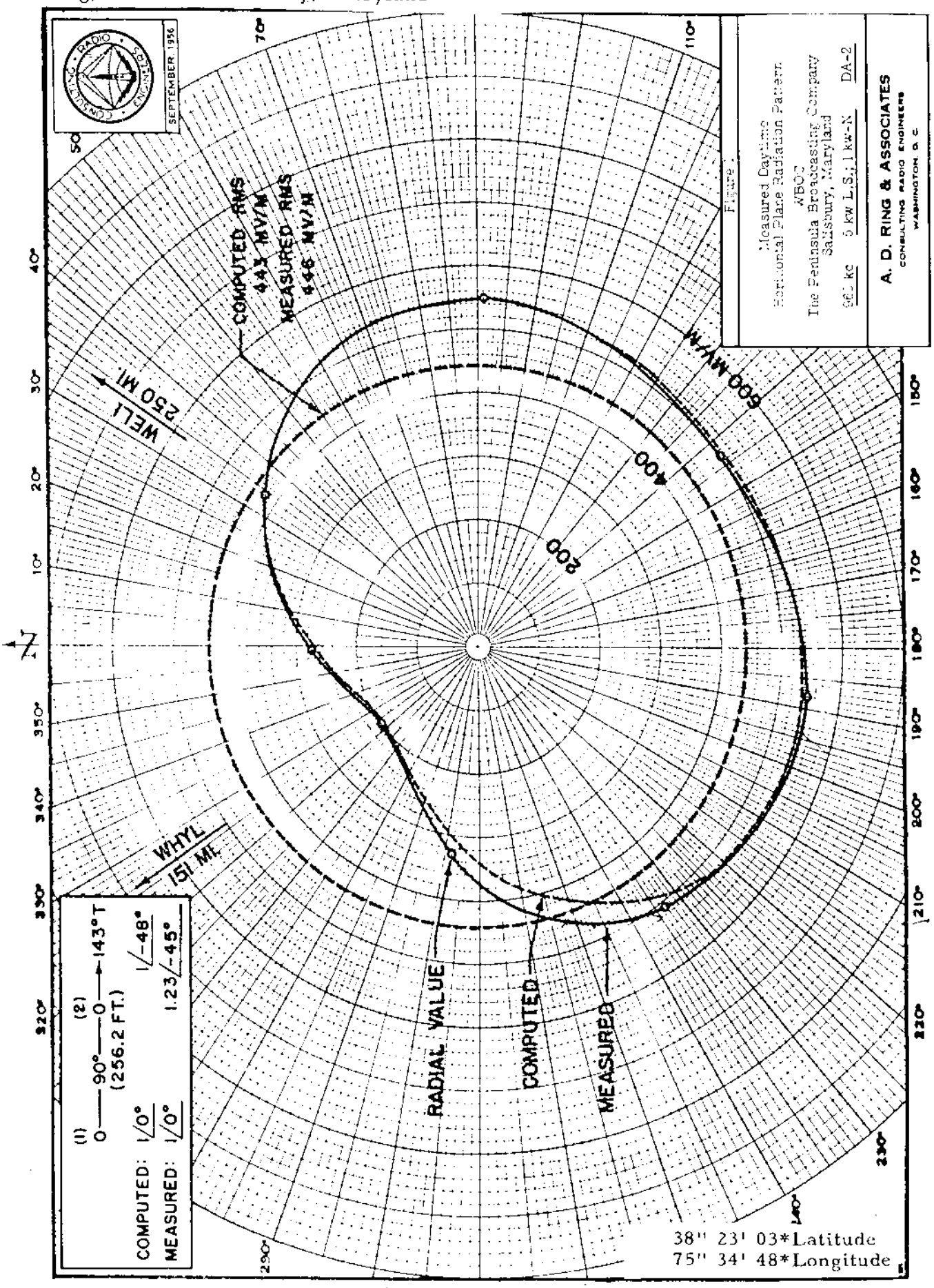
MEASURED DAY (10-21-56g)

Station W B O C
Salisbury, Maryland

1 KW, 5 KW, DA-2, U

WBOC
960 K C

granted license 11/23/56



FCC File No.
BL-6351

Accepted 10-12-56

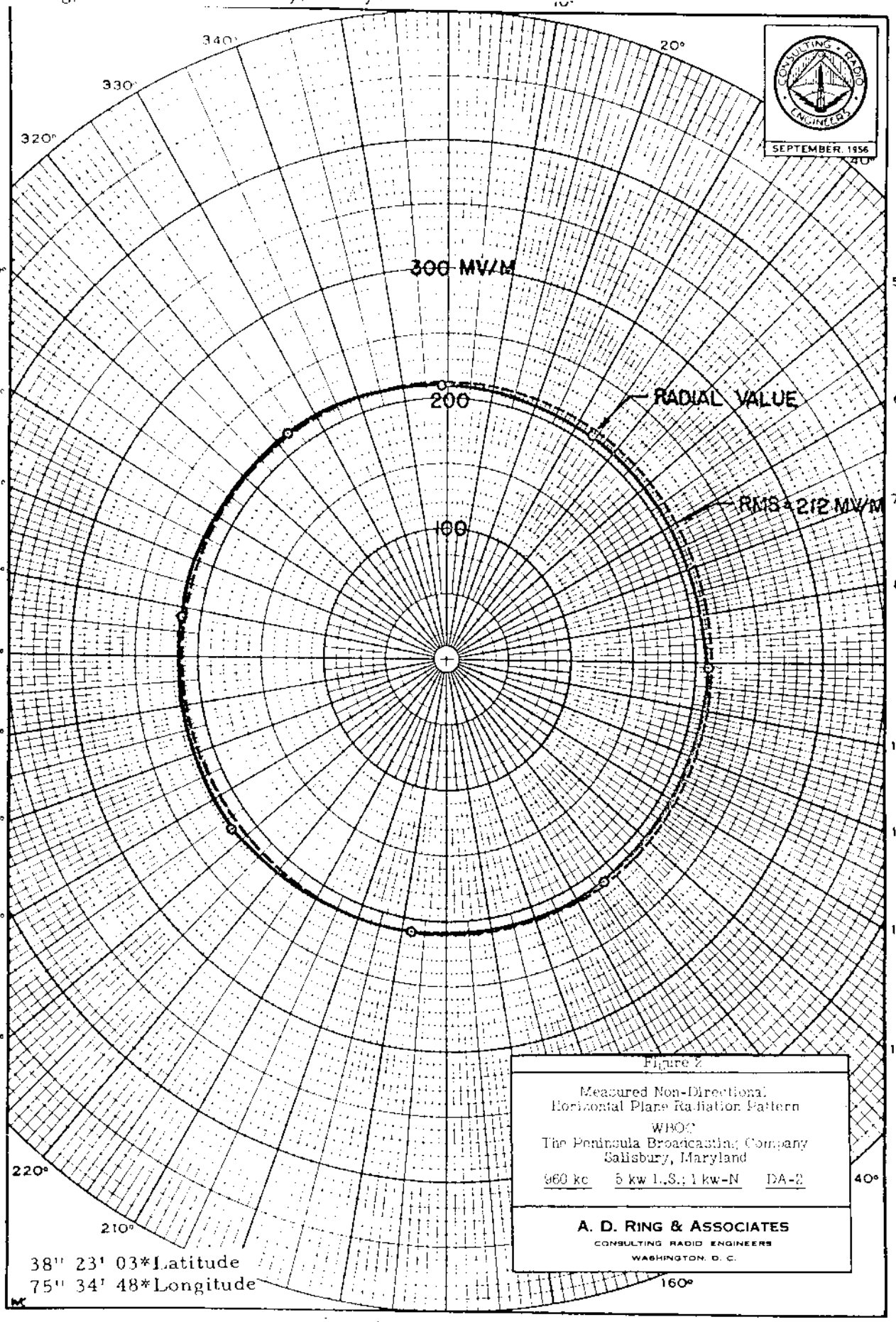
Station W B O C
Salisbury, Maryland

960 K C

WBOC

MEASURED NON-DA Station W B O C 1 KW, 5KW, DA-2, U . 960 K C
(10-21-56g) Salisbury, Maryland

granted license 11/2 5/6



A. D. RING & ASSOCIATES · 1/64 · M

FCC File No. BL-6351 Accepted 10-12-56 Station W B O C Salisbury, Maryland 960 K C

WBOC-960KC

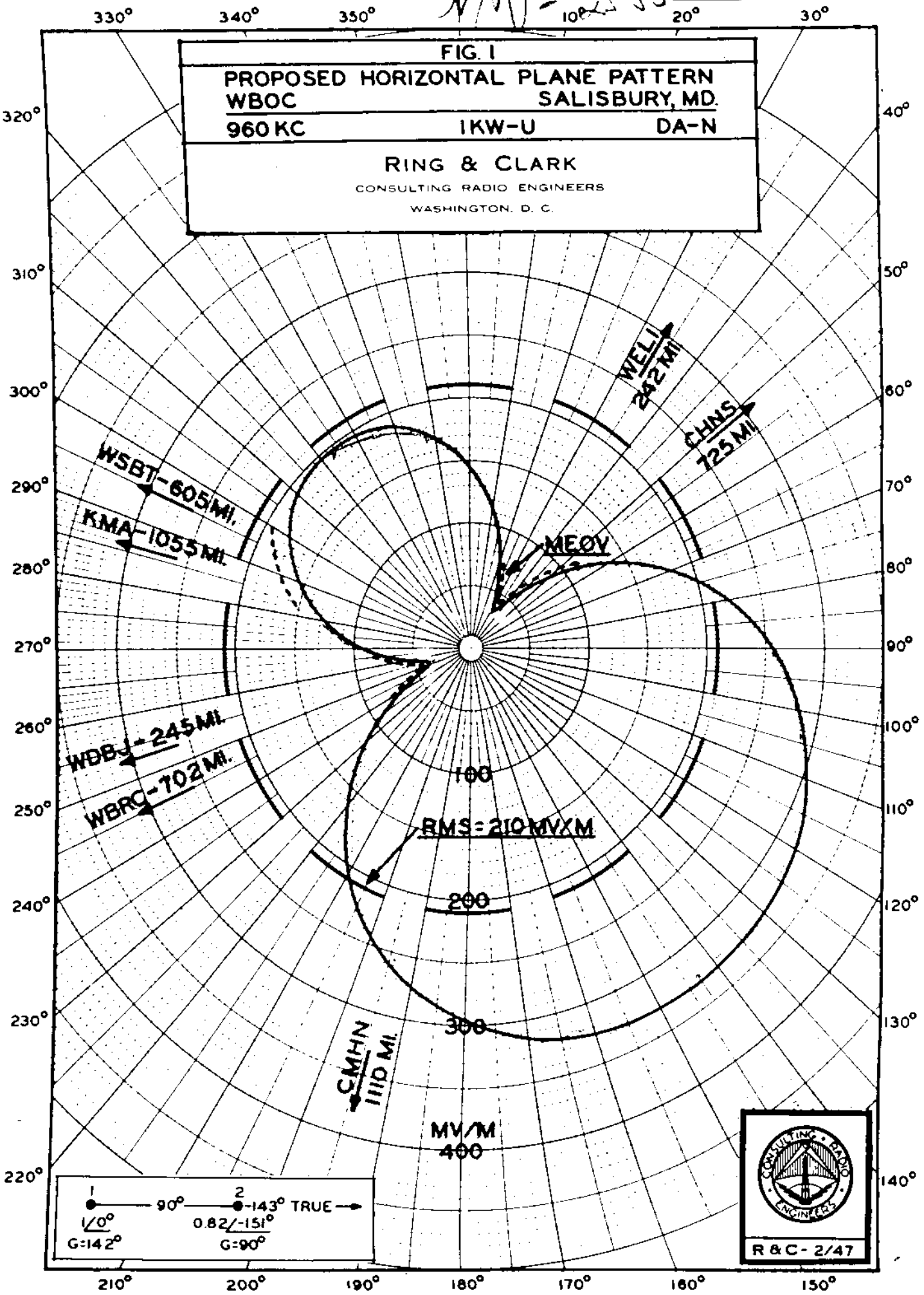


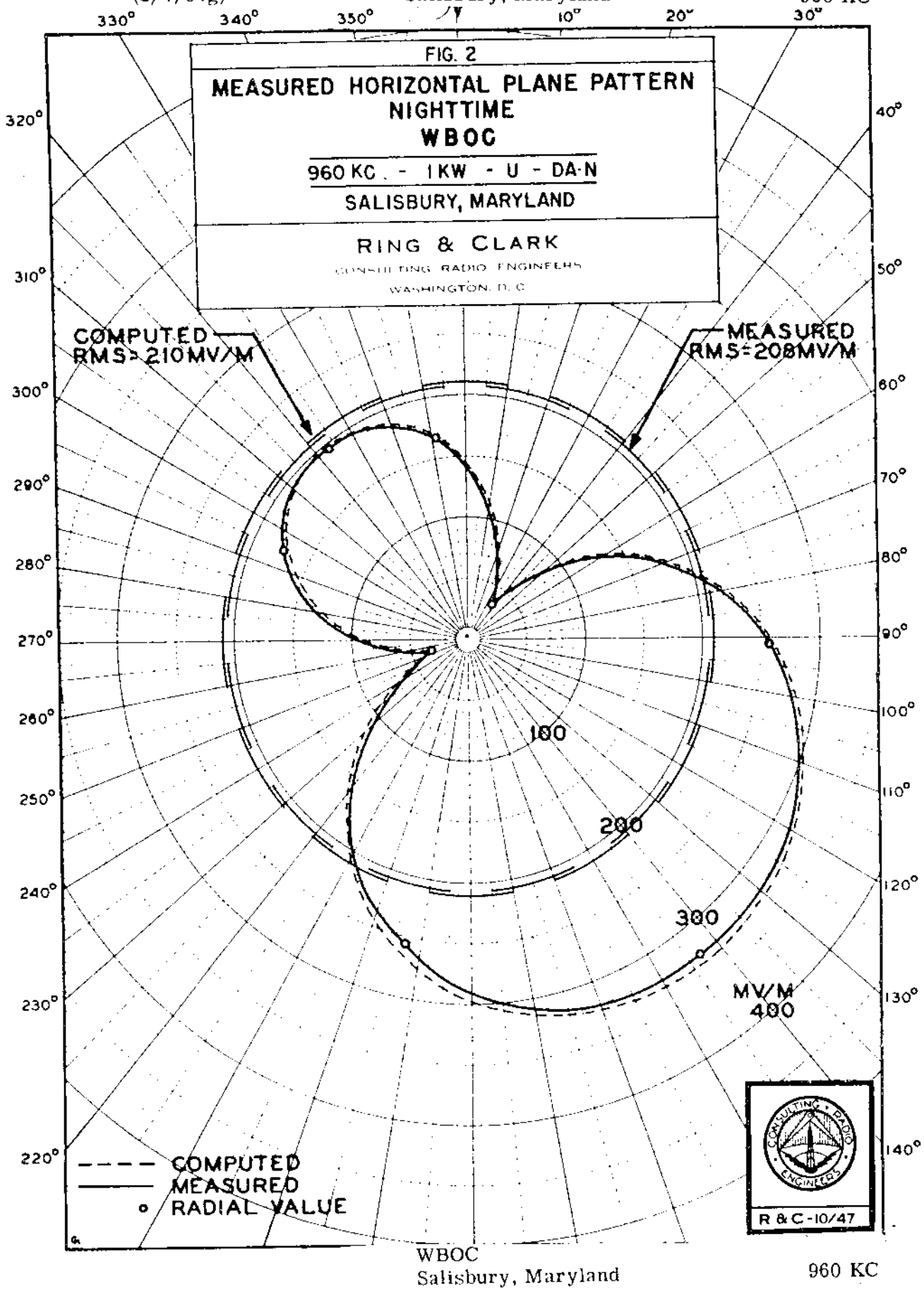
FIG. I
PROPOSED HORIZONTAL PLANE PATTERN
WBOC SALISBURY, MD.
960 KC 1KW-U DA-N
RING & CLARK
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.
WELI 242 MI.
CHNS 725 MI.
WSBT-605 MI.
KMA-1055 MI.
MEOV
WDBJ-245 MI.
WBRC-702 MI.
100
RMS=210 MV/M
200
300
CMHN 1110 MI.
MV/M
400
1
90°
2
-143° TRUE
1/0°
G=142°
0.82/-151°
G=90°
R&C-2/47

WBOC

MEASURED NIGHT
(2/7/57g)

Station WBOC
Salisbury, Maryland

1KW, DA-N,U
960 KC →



WBOC
Salisbury, Maryland

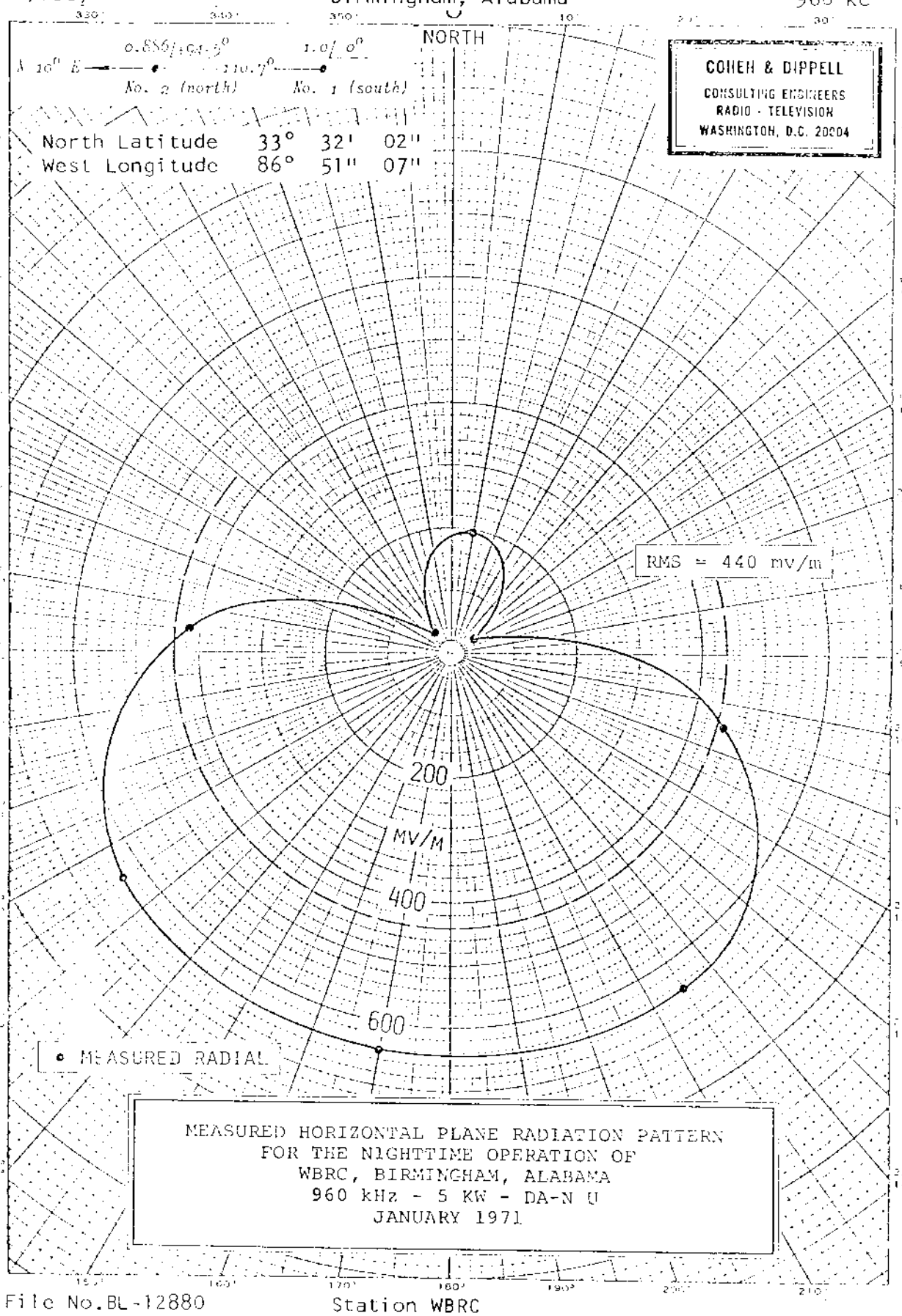
960 KC

WBRC

Measured Night
(3-22-71ct)

Station WBRC
Birmingham, Alabama

5kw, DA-N, U
960 kc



FCC File No. BL-12880
Accepted 2-26-71

Station WBRC
Birmingham, Alabama

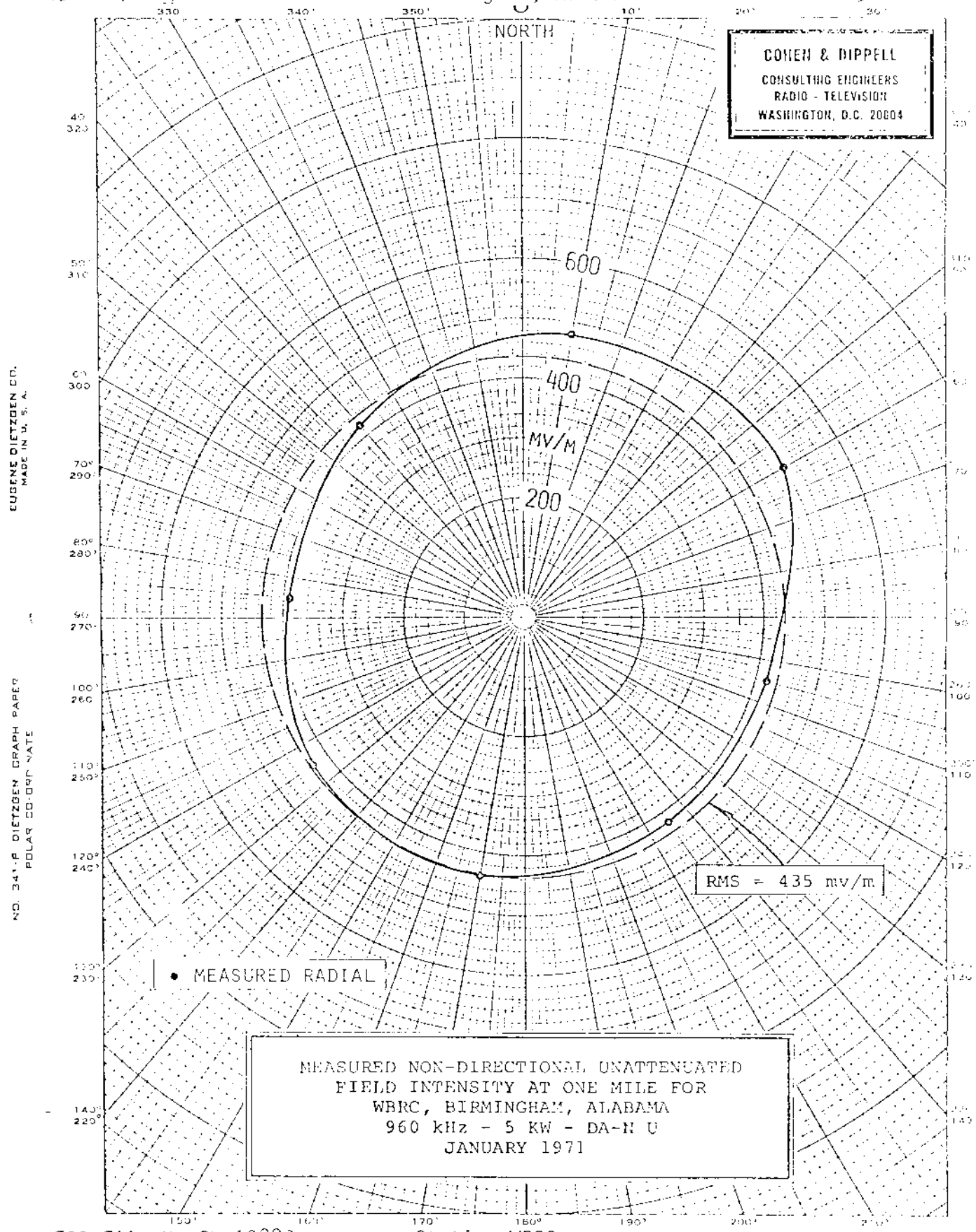
960 kc

WBRC

Measured Non-DA
(3-22-71ct)

Station WBRC
Birmingham, Alabama

5kw, DA-N, U
960 kc



FCC File No. BL-12880
Accepted 2-26-71

Station WBRC
Birmingham, Alabama

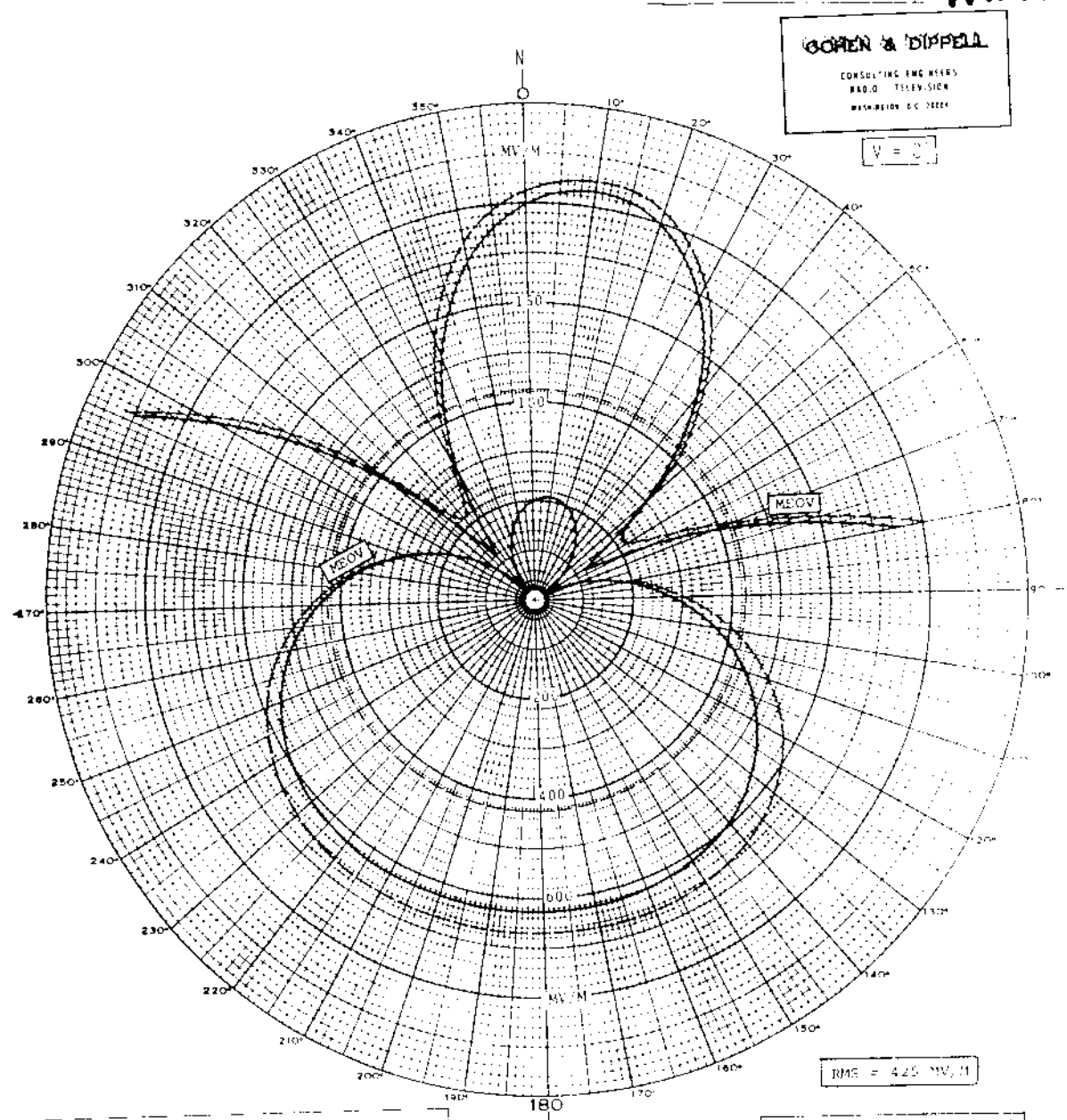
960 kc

Proposed Night
(8-26-70ct)

Station WBRC
Birmingham, Alabama

5kw,DA-N,U
960 kc

SEE REVERSE SIDE WBRC



COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR THE PROPOSED NIGHTTIME OPERATION OF
WBRC, BIRMINGHAM, ALABAMA
960 KHz - 5 KW - DA-N U
JULY 1970

FCC File No.BP-18810
Accepted 7-31-70

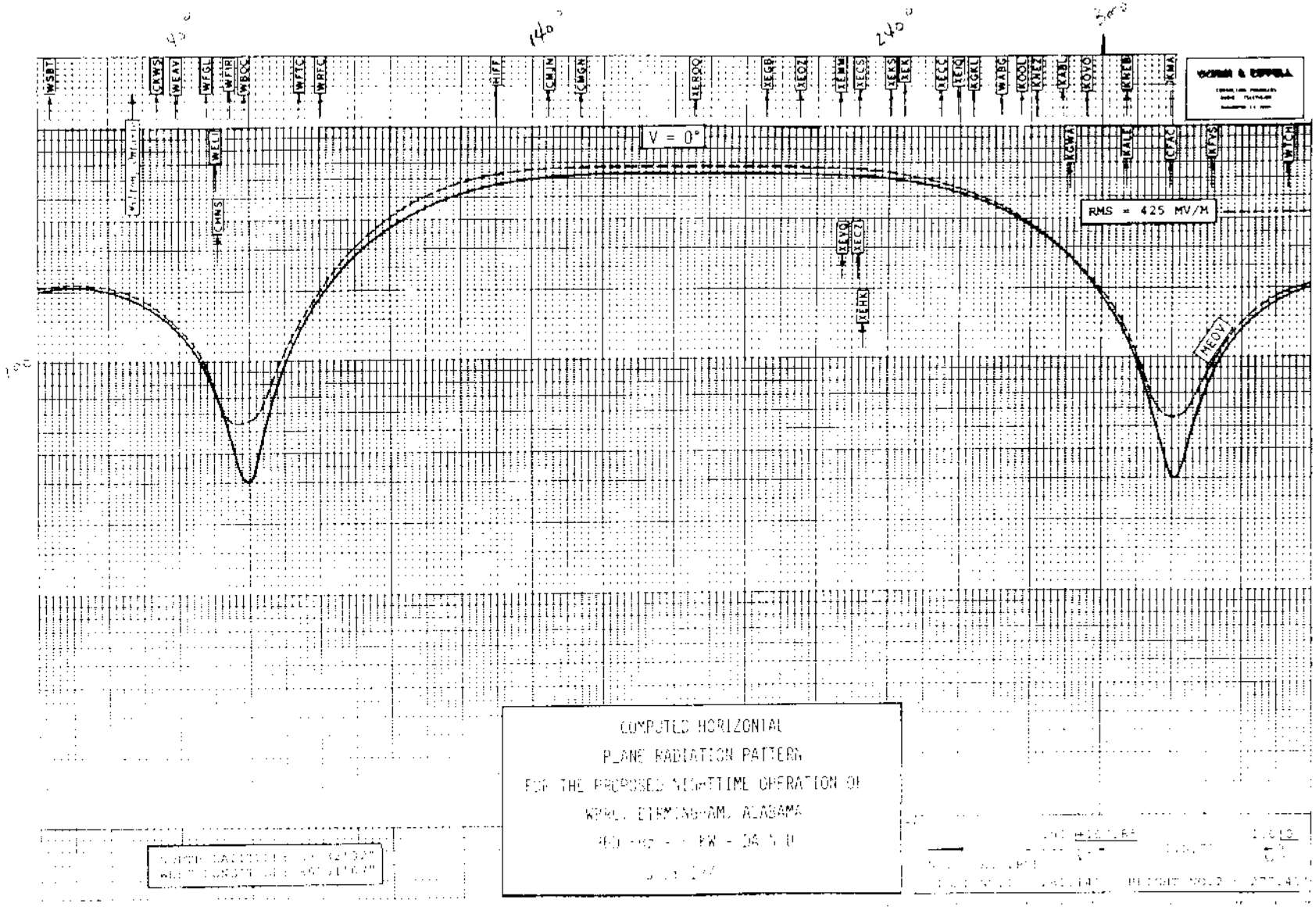
Station WBRC
Birmingham, Alabama

960 kc

Proposed Night Nulls
(8-26-70ct)

Station WBRC
Birmingham, Alabama

5kw, DA-N, U
960 kc



COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR THE PROPOSED NIGHTTIME OPERATION OF
WBRC, BIRMINGHAM, ALABAMA
960 KC - 5 KW - DA N U

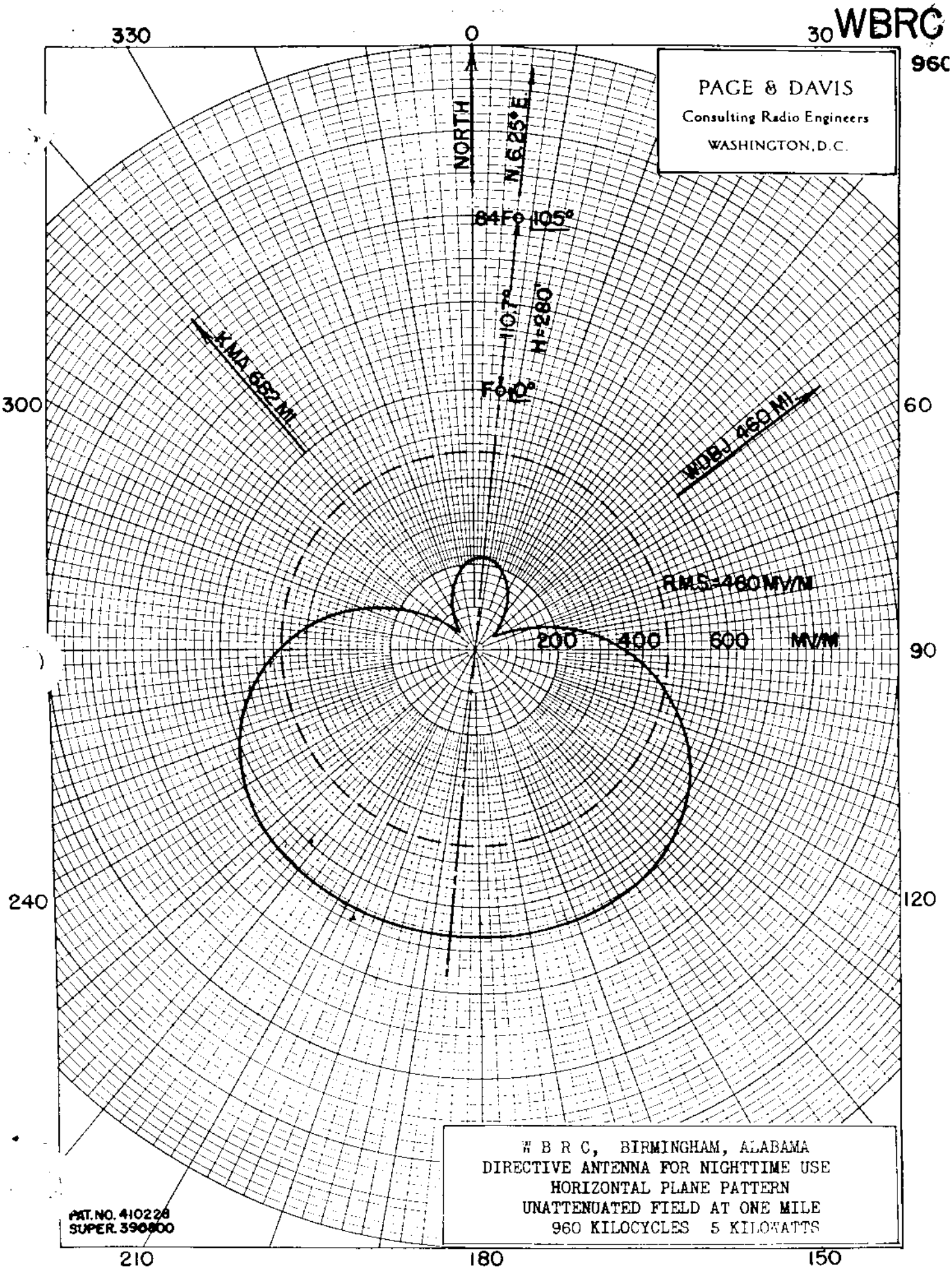
FCC File No. BP-18810
Accepted 7-31-70

Station WBRC
Birmingham, Alabama

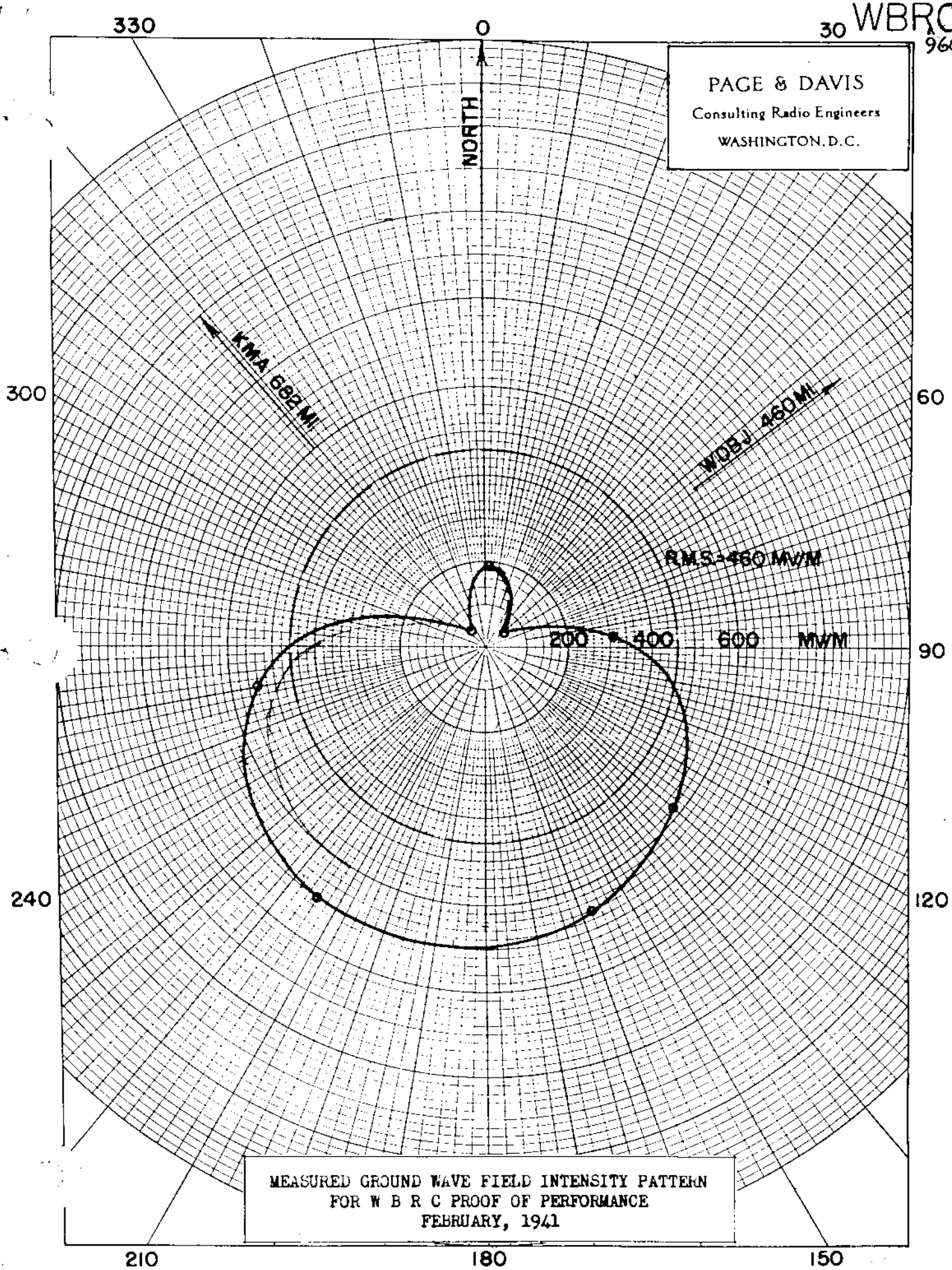
960 kc

See Reverse Side

WBRC


WBRC
PAGE & DAVIS
Consulting Radio Engineers
WASHINGTON, D.C.
NORTH
N.6.25°E.
84F0
105°
110.7°
H=280'
F0
10°
KMA 652 MI.
WDBJ 460 MI.
RMS=460MV/M
200
400
600
MV/M
330
0
30
300
60
240
90
120
210
180
150
PAT. NO. 410228
SUPER. 390800
W B R C, BIRMINGHAM, ALABAMA
DIRECTIVE ANTENNA FOR NIGHTTIME USE
HORIZONTAL PLANE PATTERN
UNATTENUATED FIELD AT ONE MILE
960 KILOCYCLES 5 KILOWATTS
KEUFFEL & ESSER CO., N.Y. NO. 343A
POLAR CO-ORDINATE
MADE IN U.S.A.

WBRC 960



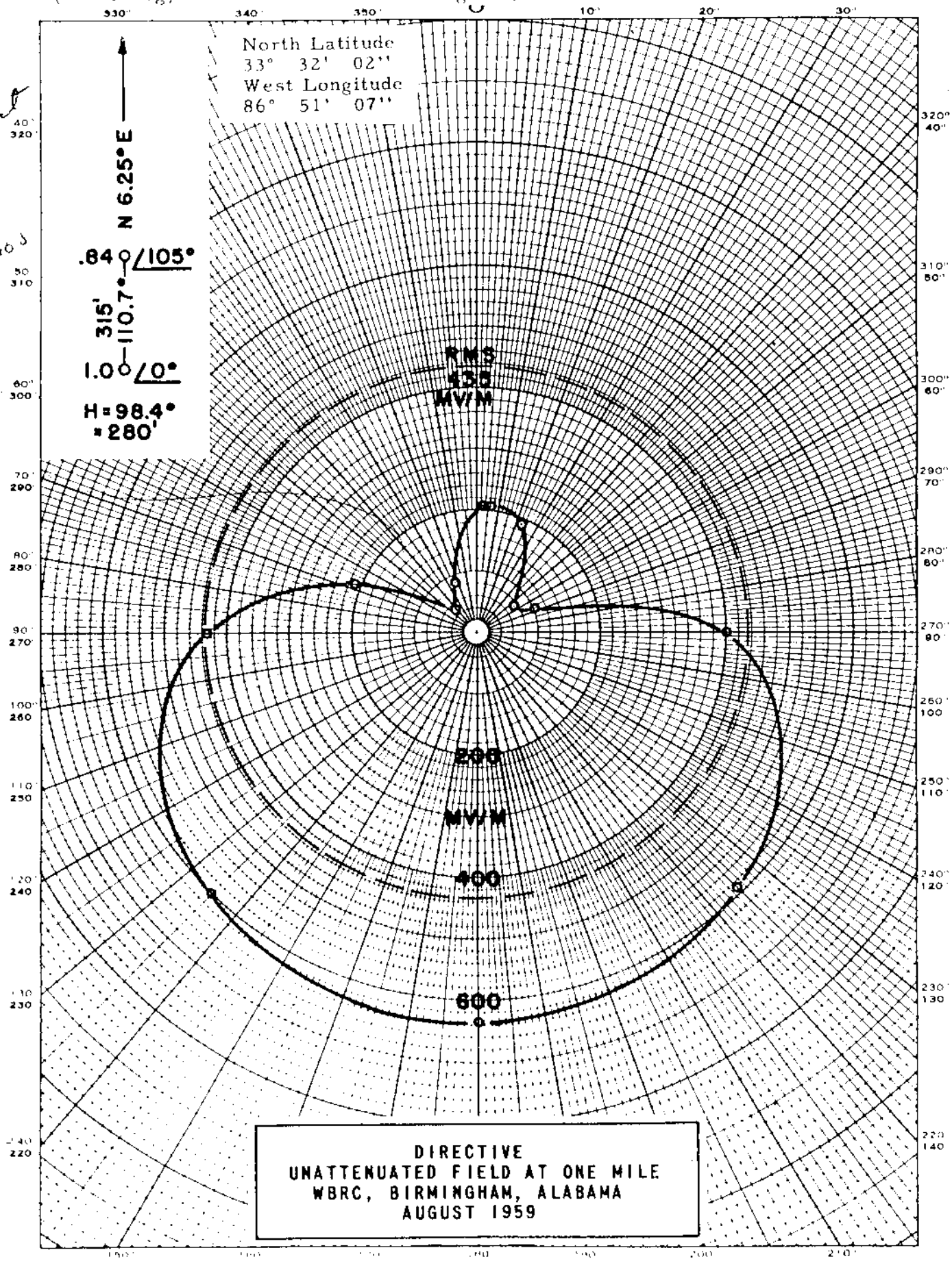
MEASURED GROUND WAVE FIELD INTENSITY PATTERN
FOR W B R C PROOF OF PERFORMANCE
FEBRUARY, 1941

WBRC

MEASURED NIGHT
(11-16-59g)

Station WBRC
Birmingham, Alabama

5kw, DA-N,U
960 KC



FCC File No. BZ -4188
Accepted 10-28-59

WBRC
Birmingham, Alabama

960 KC

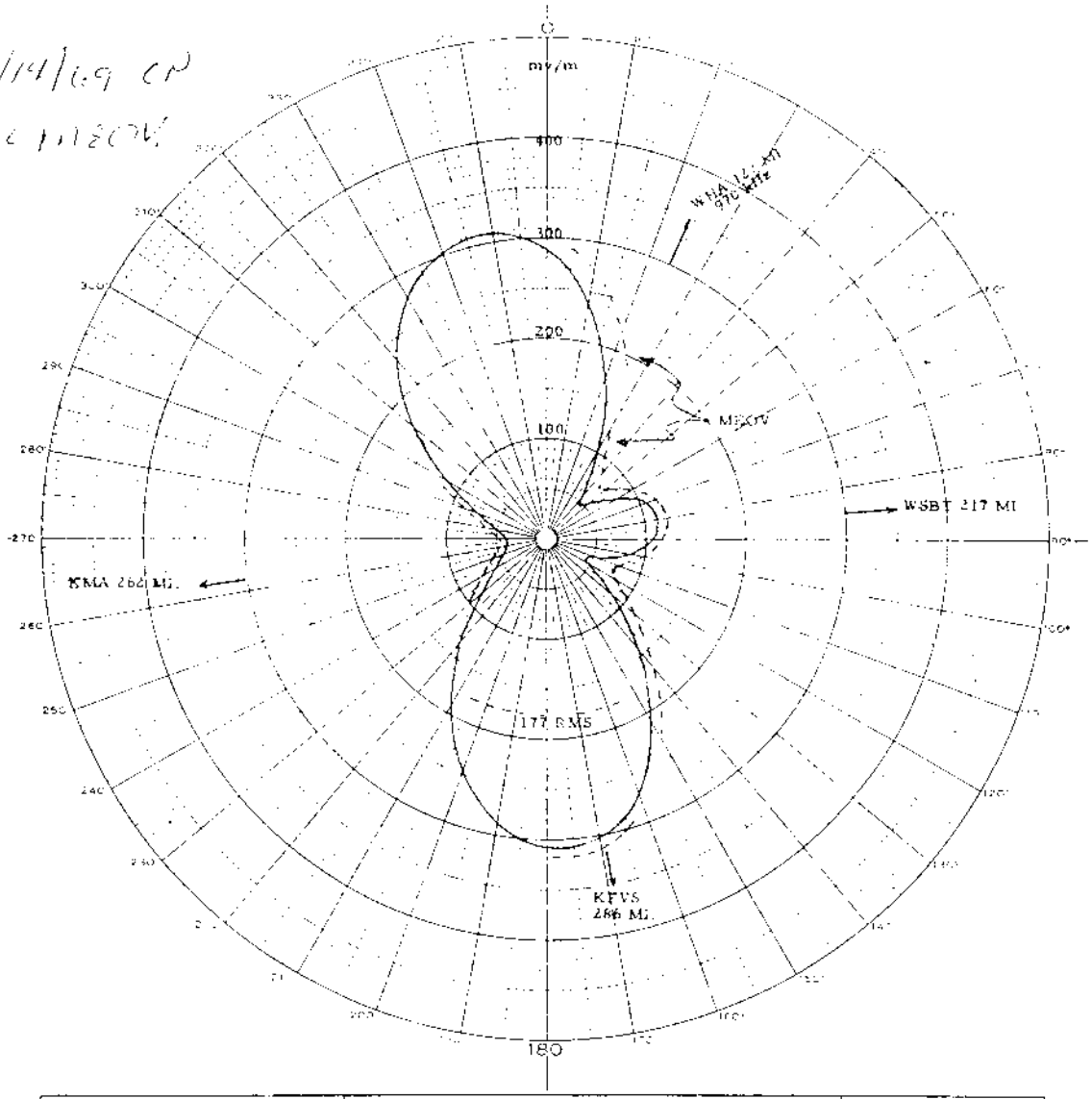
WDLM

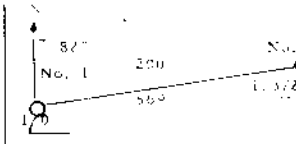
Proposed Day
(4-29-69ct)

Station WDLM
East Moline, Illinois

1kw,DA-D,D
960 kc

Granted 4/14/69 CP
[illegible] 1120W



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	STATION DATA
	90 0 0 0 133 1.0 177 90 82 200 20 173 1.5	WDLM 960 1 DA-D Class III 182 120 90 2-6 20 20 41 24 57 90 23 54 690311 690217

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FIG. 7A
DIRECTIONAL ANTENNA
THEORETICAL HORIZONTAL PATTERN

RADIO STATION WDLM
960 kHz 1 kw DA-D

FCC File No.BP-18575
Accepted 4-9-69

Station WDLM
East Moline, Illinois

960 kc

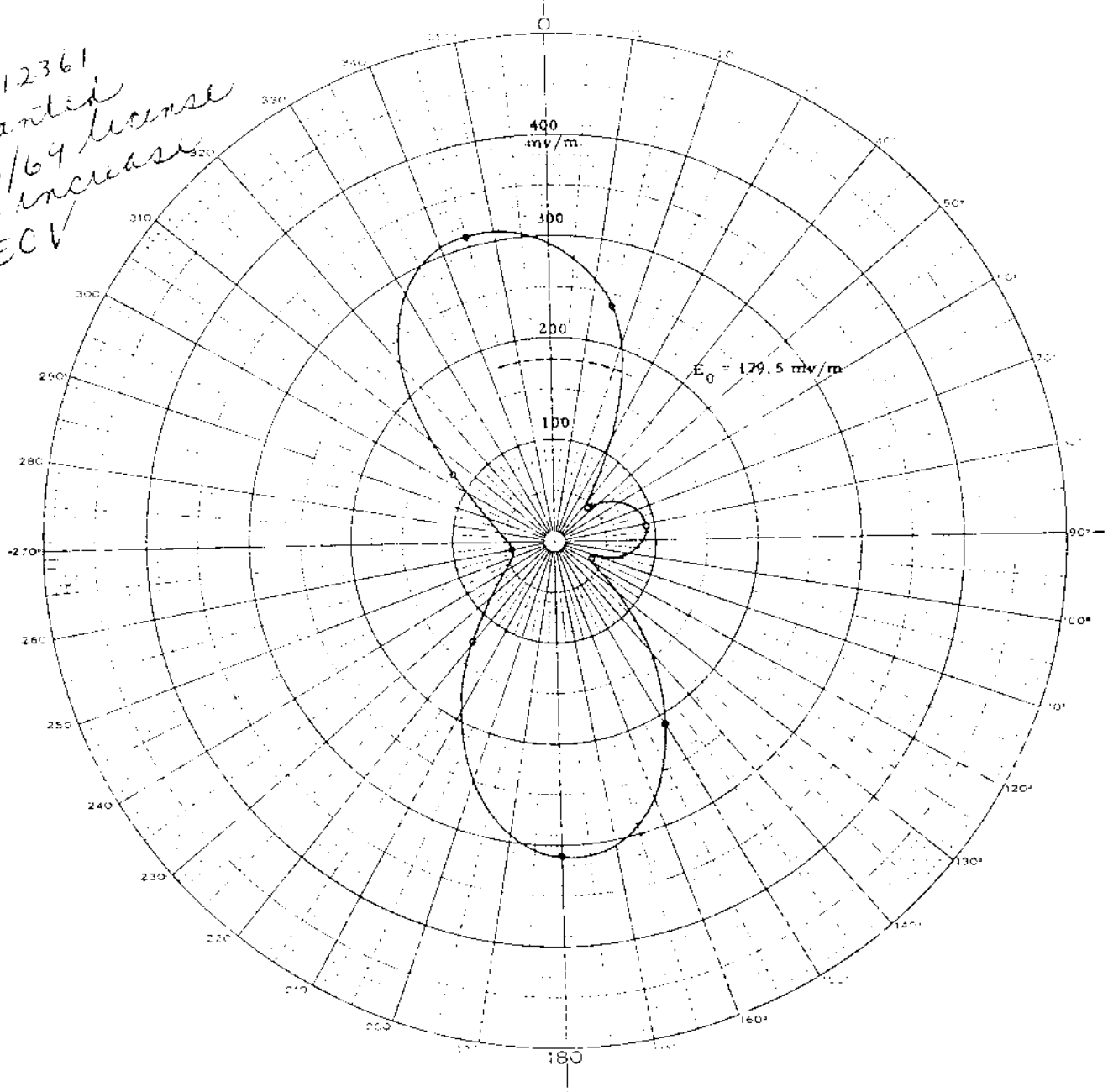
WDLM

Measured Day
(6-27-69ct)

Station WDLM
East Moline, Illinois

1kw, DA-D, D
960 kc

BL-12361
Granted
8/6/69 license
to increase
MECV



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS								STATION DATA
	Tower No.	Electrical Height	Base Tower Elevation	Spacing	Azimuth	Horizontal Field Ratio	Field Ratio	Field Angle / Relative Phase	WDLM
N, 82°, 200°, 509', 1, 1∠0, 2, 1.3∠20	1	90	0	0	0	133	1.0	179.5	Frequency 960
	2	90	82	200	20	173	1.3		Power 1
									Method of Direction DA-D
									Performance Class III
									Towers No. 1 & 2
									Antennas
									Operating Power 120
									Lat. 90 256
									Long. 20'x20'
									41 24 57
									90 23 54
									Date 680702
									681217

FIG. 6
DIRECTIONAL ANTENNA
MEASURED HORIZONTAL PATTERN
RADIO STATION WDLM
960 kHz 1 kw DA-D

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FCC File No. BL-12361
Accepted 5-28-69

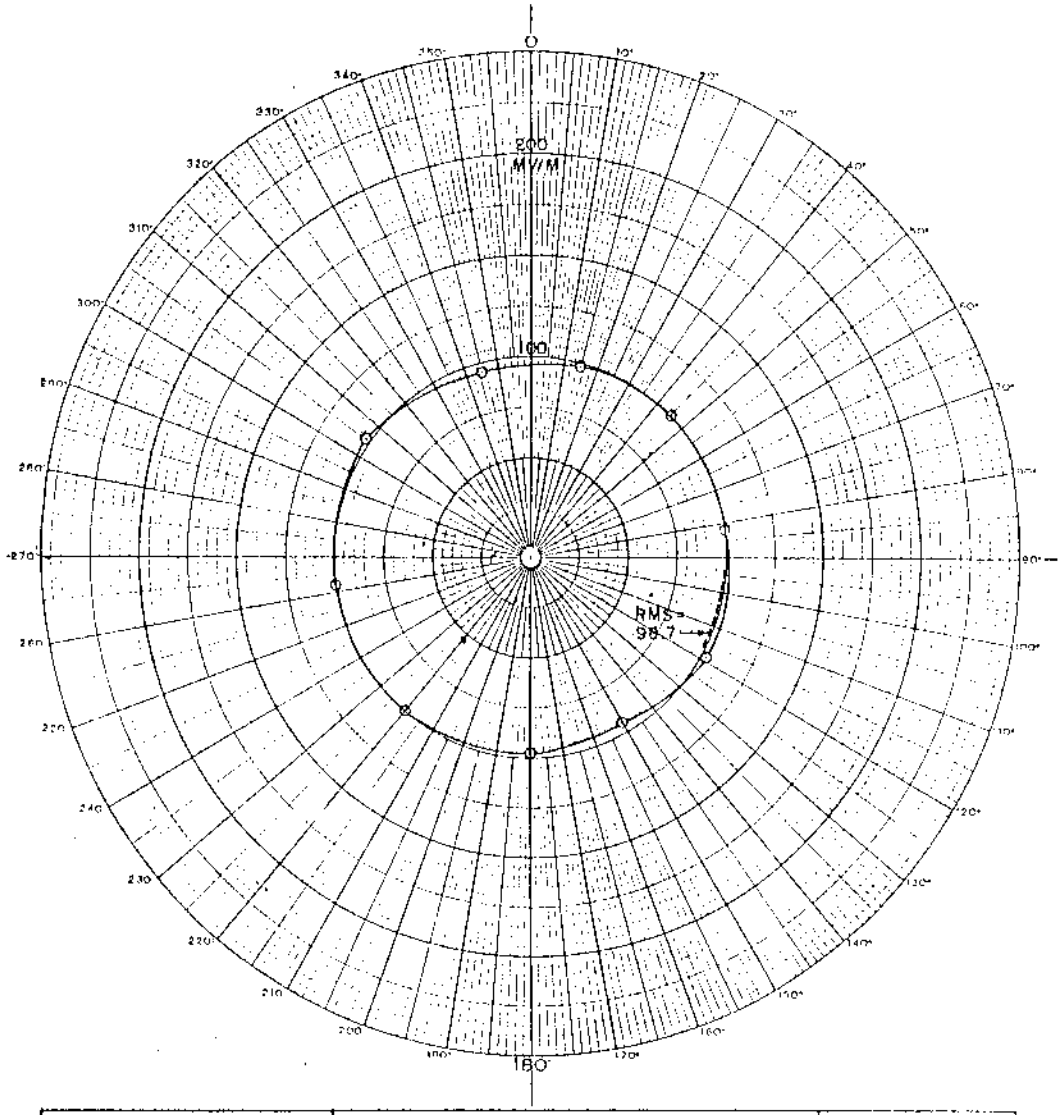
Station WDLM
East Moline, Illinois

960 kc

WDLM

MEASURED NON-DA
(4-22-60g)

Station WDLM 1kw, DA-D,D
East Moline, Illinois 960 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA
	TOWER	ELECTRICAL HEIGHT	THRU TOWER ORIENTATION	SPACING	PHASING	HORIZONTAL FIELD RATIO	FIELD RATIO	ELEV ANGLE	ELEVATION RMS FIELD	CALL WDLM
										FREQUENCY 960
										POWER 0.25
	1							0	98.7	TIME OF OPERATION DA-D
	2	90°						10		TYPE OF OPERATION CLASS III
	3							20		DAYTIME POWERS No. 1 & 2
	4							30		NIGHTTIME POWERS —
	5							40		VERTICAL RADIATION 120
	6							50		LENGTH OF BASELINE 90' 256.7'
	7							60		GROUND SYSTEM DIMENSION 20'x20'
	8							70		LAT 41° 24' 57"
	9							80		LONG 90° 23' 54"
	10									SUPERVISOR
	DAYTIME OPERATION ☒			NIGHTTIME OPERATION ☐						PATTERN No. 600309

N
82°
200°
569'
FLOATING

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FIG. 6.12
250 WATT NON-DIRECTIONAL
MEASURED HORIZONTAL PATTERN
MOODY BIBLE INSTITUTE
EAST MOLINE, ILLINOIS

FCC File No. BL-7880
Accepted 4-13-60

WDLM
East Moline, Illinois 960 KC

WEAV

DIRECTIONAL ANTENNA DESCRIPTION SHEET

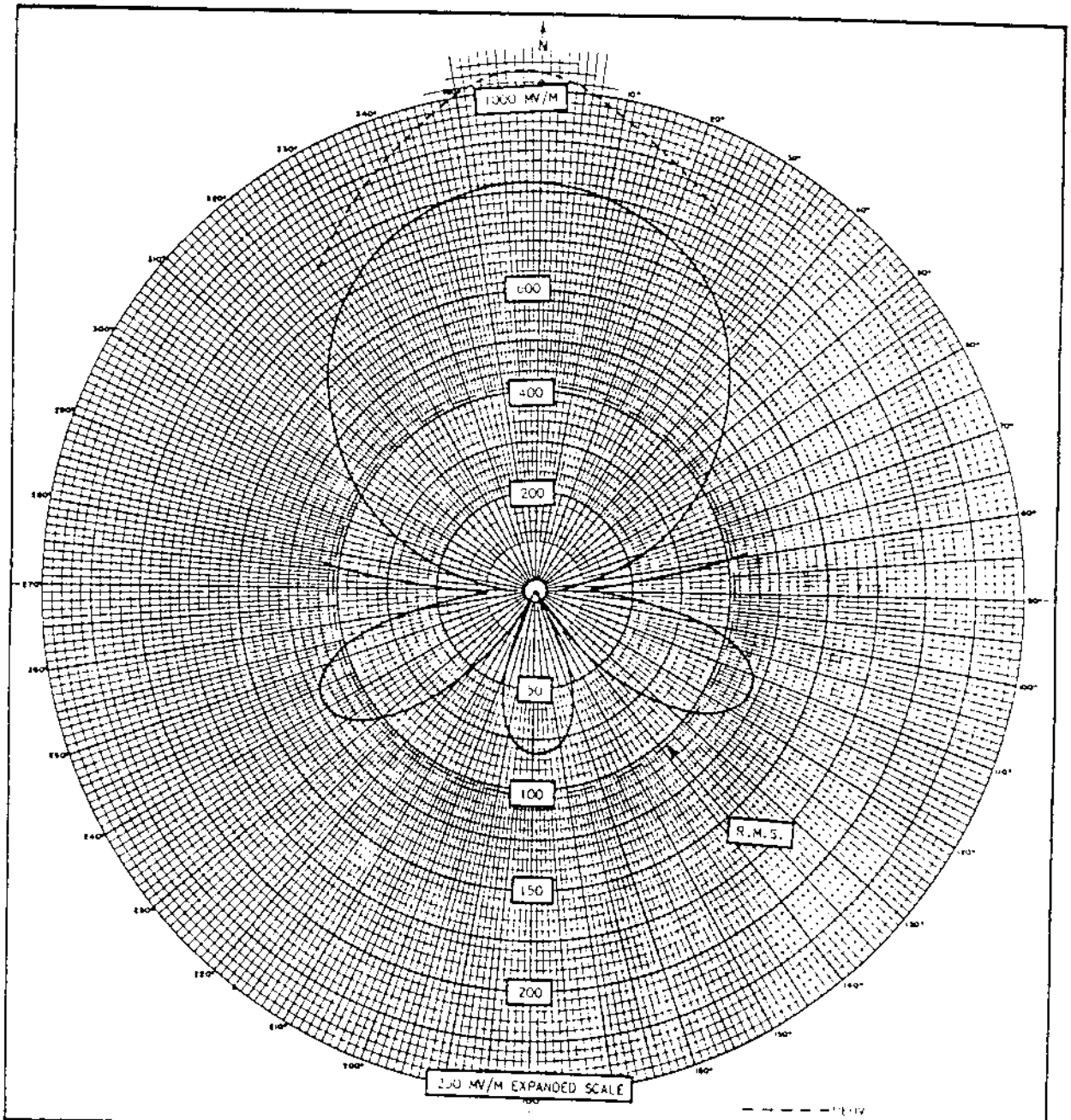
Station	: WEAV	Main Studio:	Plattsburgh, New York
Frequency	: 960 KHz	Power	: 5 kW Night 5 kW Day
Notification	: 1780	Date	: Sept. 28, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude:	44	34	27
West Longitude:	73	26	54

Note: Please retain the description sheet and the daytime and nighttime (vertical sections) directional antenna radiation patterns notified for station WEAV in United States Change List Number 628, dated Oct. 19, 1951 and attach to this supplemental Description Sheet and nighttime horizontal directional antenna radiation pattern. This notification is for the purpose of indicating only the addition of MEOV's to the nighttime horizontal directional radiation pattern.

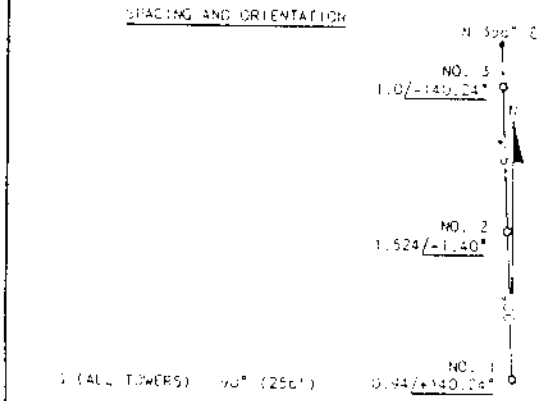
WEAV



PROPOSED HORIZONTAL RADIATION PATTERN (NIGHTTIME)

FIGURE 1

SPACING AND ORIENTATION



APPLICANT	PLATTSBURGH BCSTG CORP. (WEAV)
LOCATION	PLATTSBURGH, NEW YORK
FREQUENCY	760 KC/S
POWER	2 KW-D (DA-2)
LATITUDE	44 DEG 34 MIN 27 SEC.
LONGITUDE	73 DEG 26 MIN. 54 SEC.
WHEN USED	NIGHTTIME
R.M.S. FIELD	410.0 MV/M
DATE	AUGUST 1977

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS

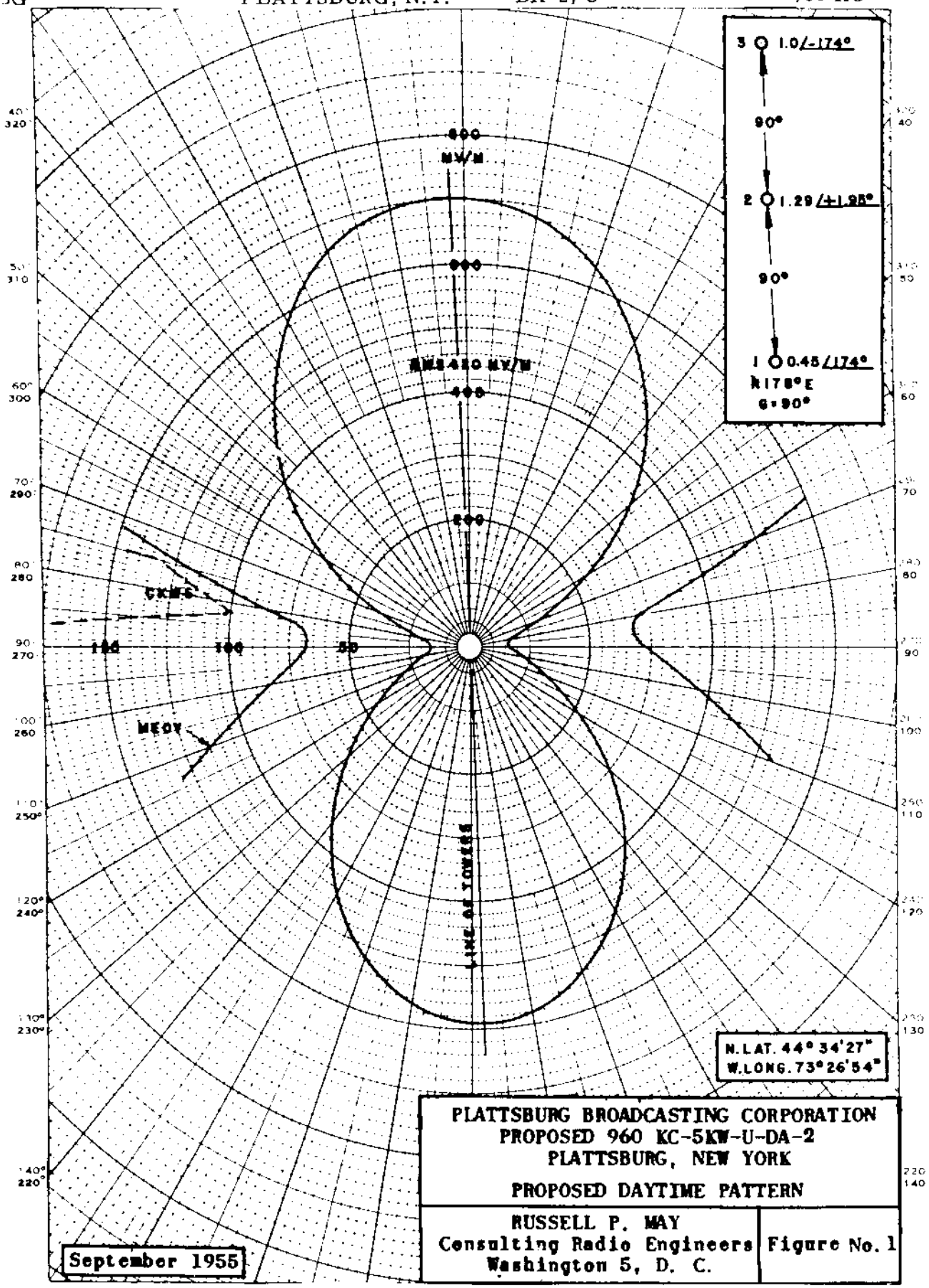
WEAV

PROPOSED DAY
10/6/55G

STATION WEAV
PLATTSBURG, N.Y.

5 KW
DA-2, U

960 KC



PLATTSBURG BROADCASTING CORPORATION
PROPOSED 960 KC-5KW-U-DA-2
PLATTSBURG, NEW YORK

PROPOSED DAYTIME PATTERN

RUSSELL P. MAY
Consulting Radio Engineers
Washington 5, D. C.

Figure No. 1

September 1955

File No. BP-9882 Amended Accepted 9/13/55 WEAV, PLATTSBURG, N.Y. 960 KC

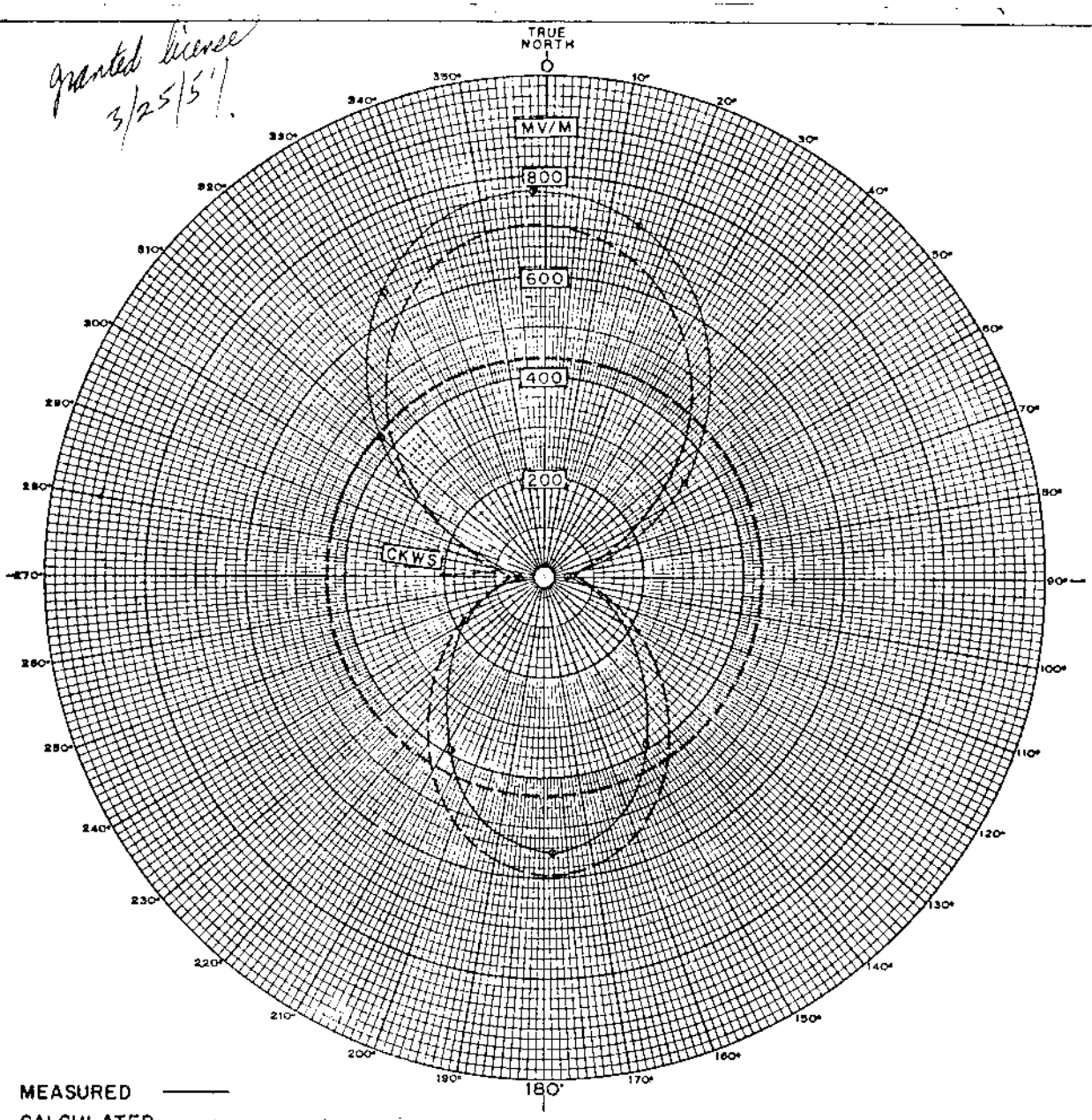
WEAV

MEASURED DAY
(3/29/57g)

Station WEAV
Plattsburg, New York

5KW, DA-2,U
960 KC

granted licence 3/25/57



*Corrected pattern, not on public notice.

G = 90° (256')

3 — 1.0/-174°

90° (256')

2 — 1.29/+1.95°

90° (256')

1 — 0.45/174°

N 178° E

FIELD INTENSITY VERSUS AZIMUTH	
ELEVATION ANGLE 0°	PLATTSBURG BROADCASTING CORPORATION
RMS 435 MV/M	960 KC - 5 KW - (DA-2)
N. LATITUDE 44° 34' 27"	PLATTSBURG, NEW YORK
W. LONGITUDE 73° 26' 54"	
SUPERSEDES 561110	MEASURED DAYTIME PATTERN
PATTERN NO. 570305	
RUSSELL P. MAY CONSULTING RADIO ENGINEER WASHINGTON 5, D.C.	FIGURE NO. 6A

FCC File No. BL-6435
Accepted 3/19/57

Station WEAV
Plattsburg, New York

960 KC

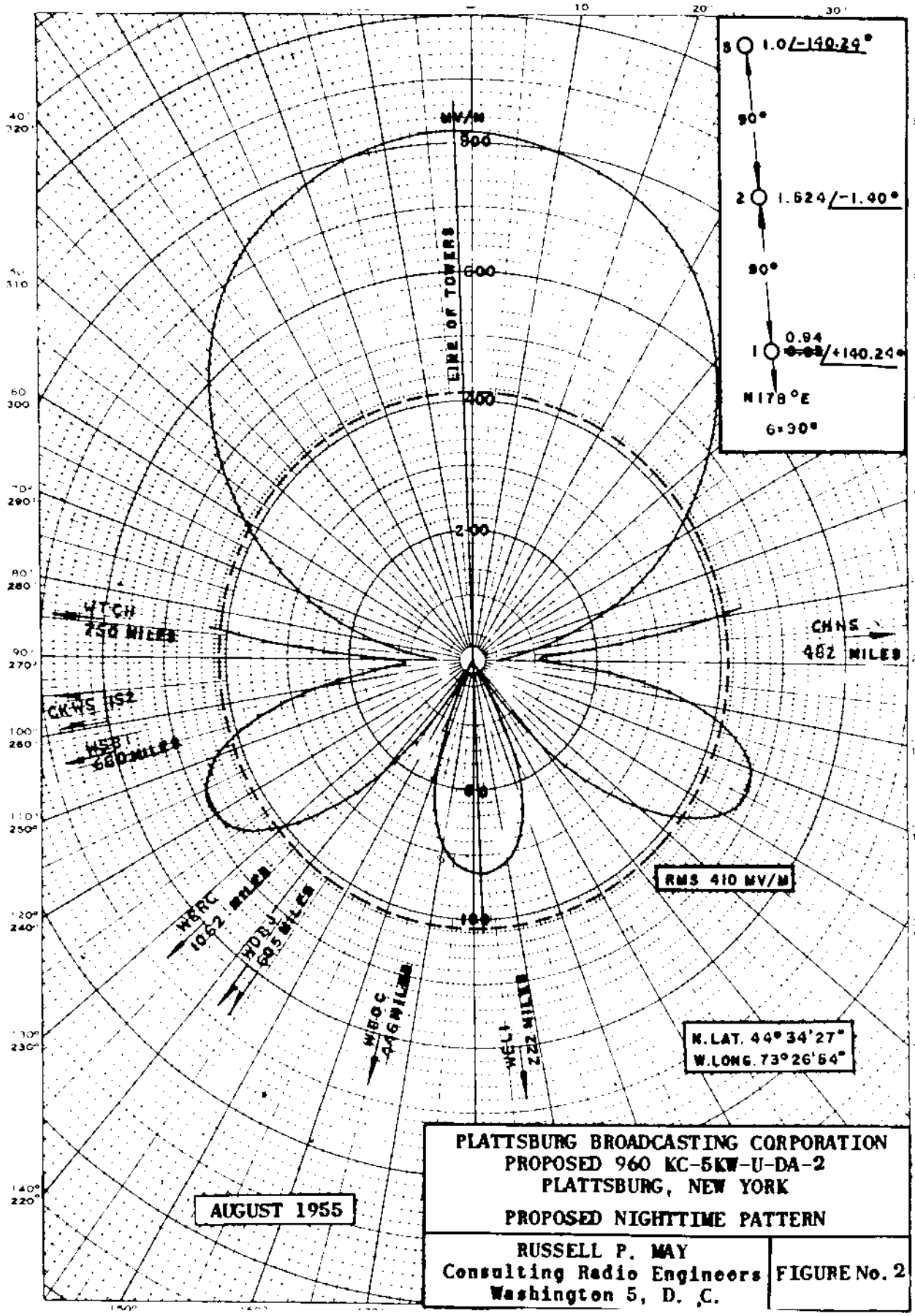
WEAV

PROPOSED NIGHT
(9/8/55G)

STATION WEAV
PLATTSBURG, NEW YORK

5 KW
DA-2, U

960 KC



FILE NO. BP-9882(Amended) ACCEPTED FCC 8/16/55 WEAV, Plattsburg, N. Y. 960 KC

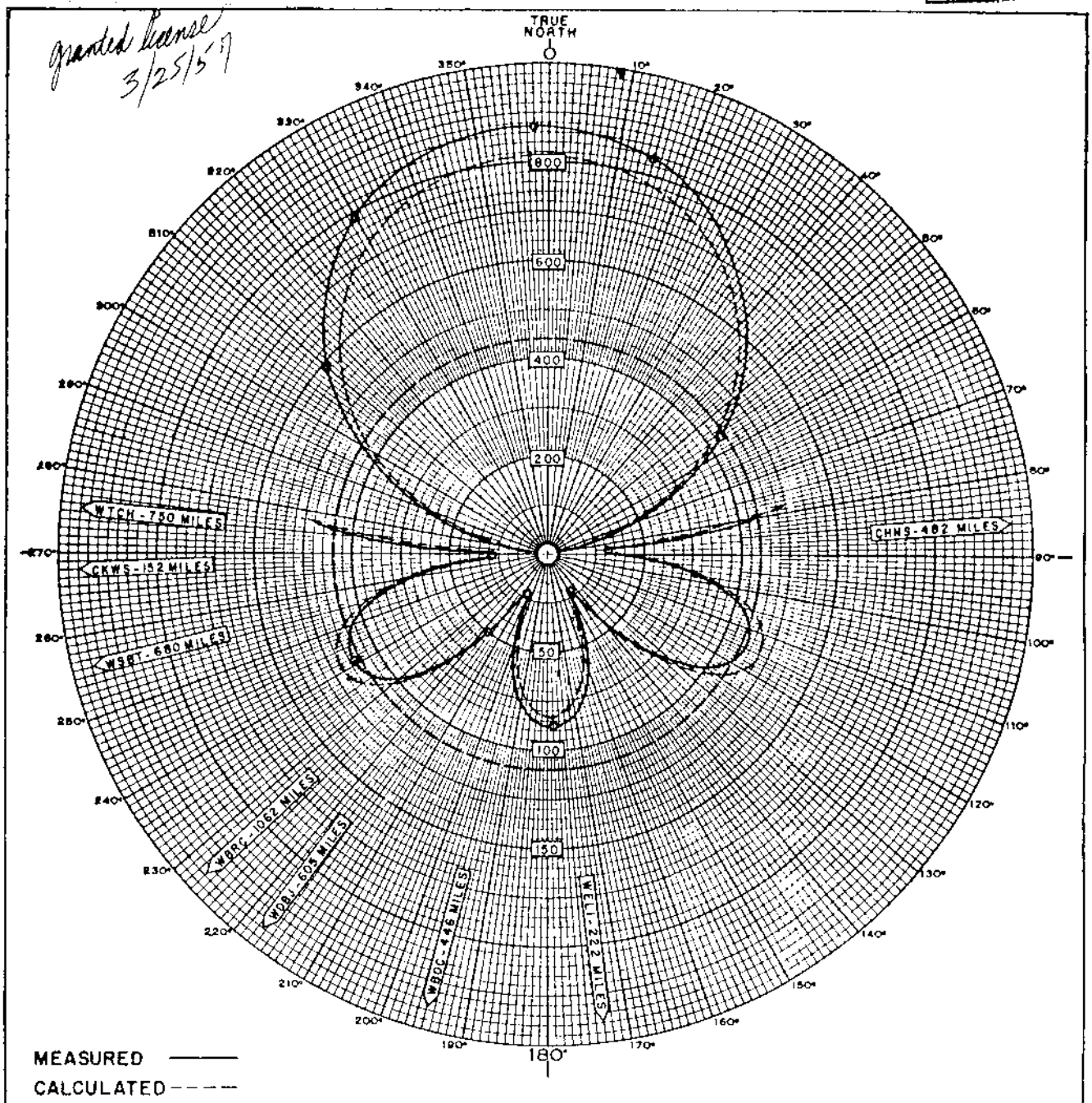
WEAV

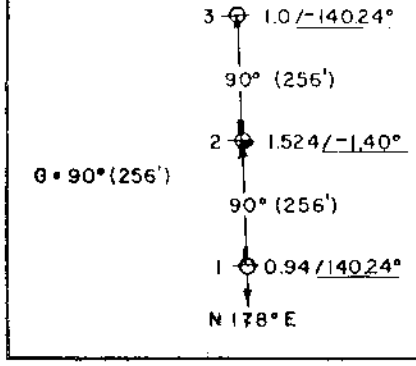
MEASURED NIGHT
(2/20/57g)

WEAV
Plattsburg, New York

5KW, DA-2, U
960 KC

granted license 3/25/57





FIELD INTENSITY VERSUS AZIMUTH	
ELEVATION ANGLE 0° RMS 440 MV/M	PLATTSBURG BROADCASTING CORPORATION 960 KC 5KW DA-2 PLATTSBURG, NEW YORK
N. LATITUDE 44° 34' 27" W. LONGITUDE 73° 26' 54"	
SUPERSEDES PATTERN NO. 561110	MEASURED NIGHTTIME PATTERN
RUSSELL P. MAY *CONSULTING RADIO ENGINEER* *WASHINGTON 5, D.C.*	FIGURE NO. 7

FCC File No. BL-6435
Accepted 12/17/56

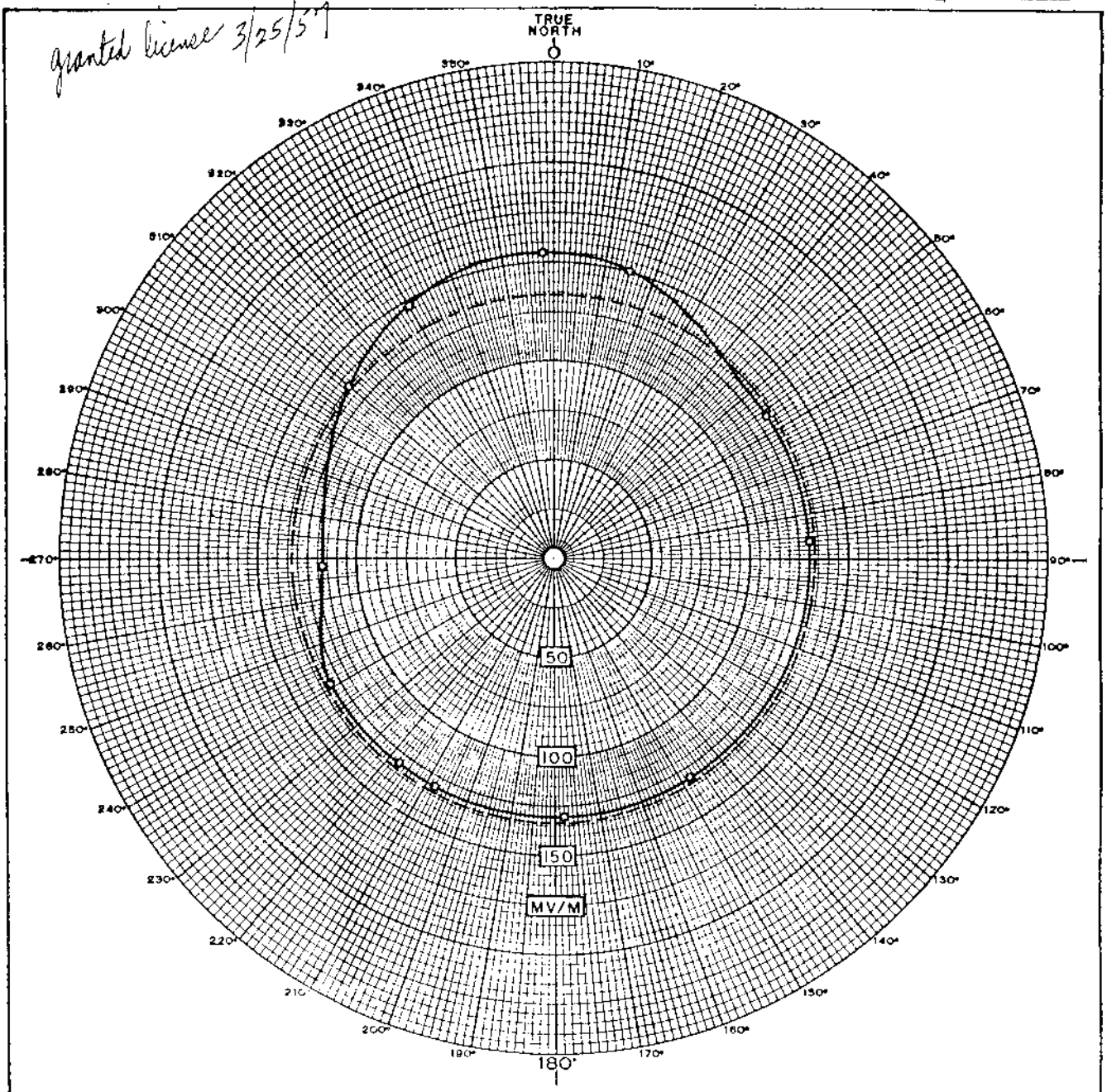
WEAV
Plattsburg, New York

960 KC

WEAV

MEASURED NON-DIRECTIONAL (2/20/57g) | WEAV Plattsburg, New York | 5KW, DA-2, U 960 KC

granted license 3/25/57



FIELD INTENSITY VERSUS AZIMUTH	
ELEVATION ANGLE 0° RMS 133 MV/M (500 WATTS)	PLATTSBURG BROADCASTING CORPORATION 960 KC-5 KW-(DA-2) PLATTSBURG, NEW YORK
N. LATITUDE 44° 34' 27" W. LONGITUDE 73° 26' 54"	
SUPERSEDES PATTERN NO. 561110	MEASURED NON-DIRECTIONAL PATTERN
RUSSELL P. MAY *CONSULTING RADIO ENGINEER* *WASHINGTON 5, D.C.*	FIGURE NO. 5

FCC File No. BL-6435
Accepted 12/17/56

WEAV
Plattsburg, New York

960 KC

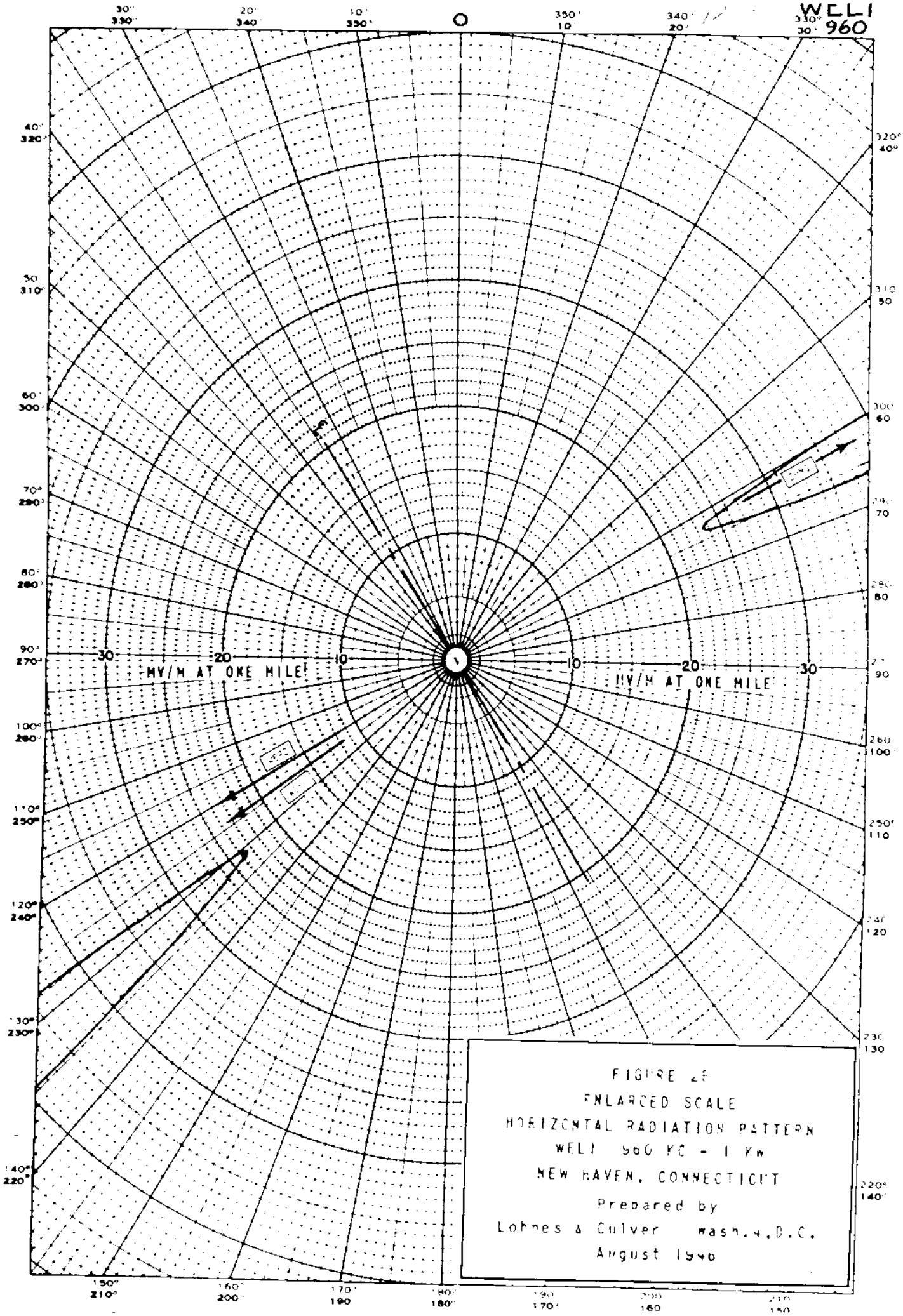


FIGURE 2E
ENLARGED SCALE
HORIZONTAL RADIATION PATTERN
WELI 960 KC - 1 Kw
NEW HAVEN, CONNECTICUT
Prepared by
Lohnes & Culver Wash. 4, D.C.
August 1946

WELI-960 WELI 960

Granted license for increase daytime power to 1.5 KW

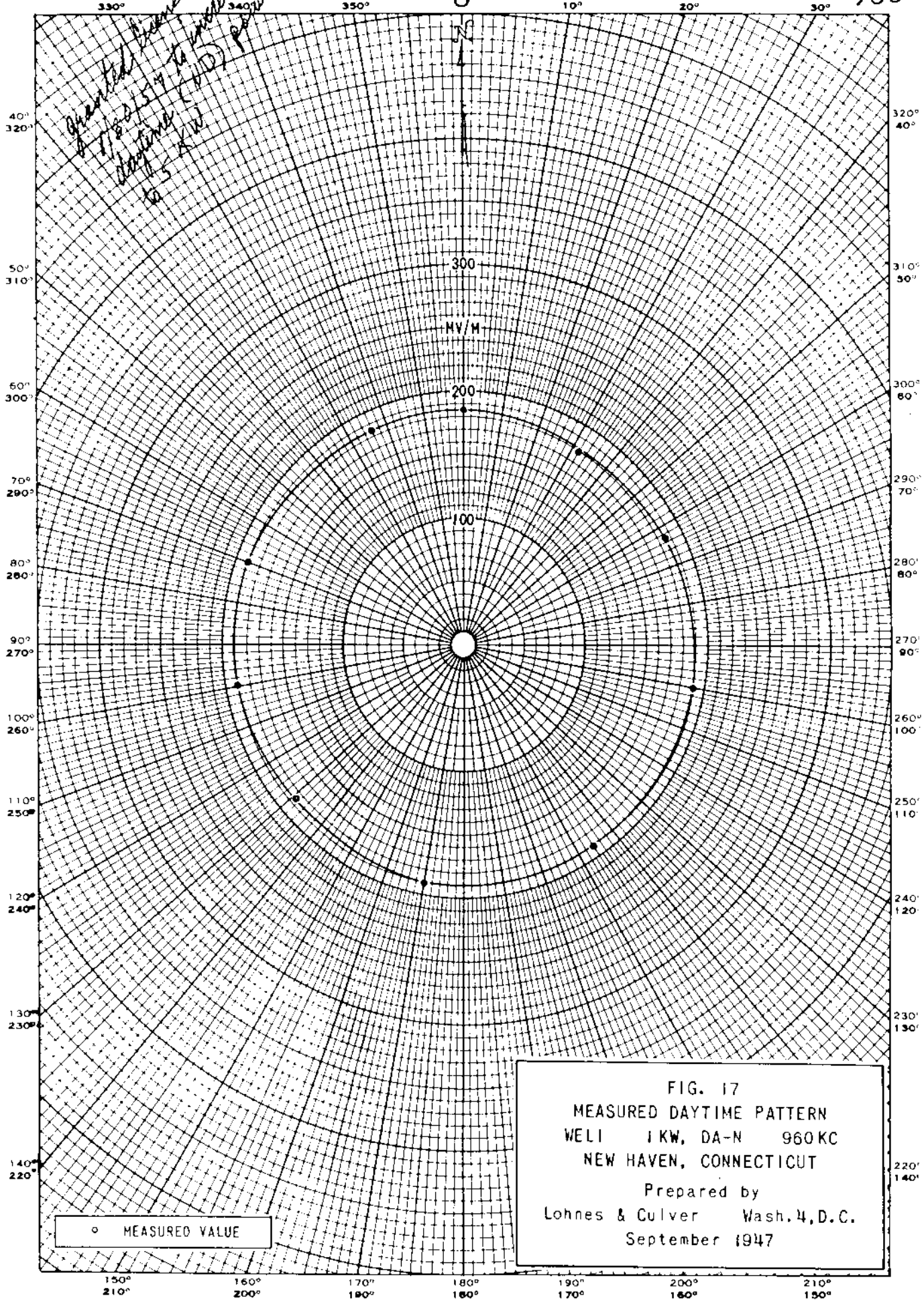


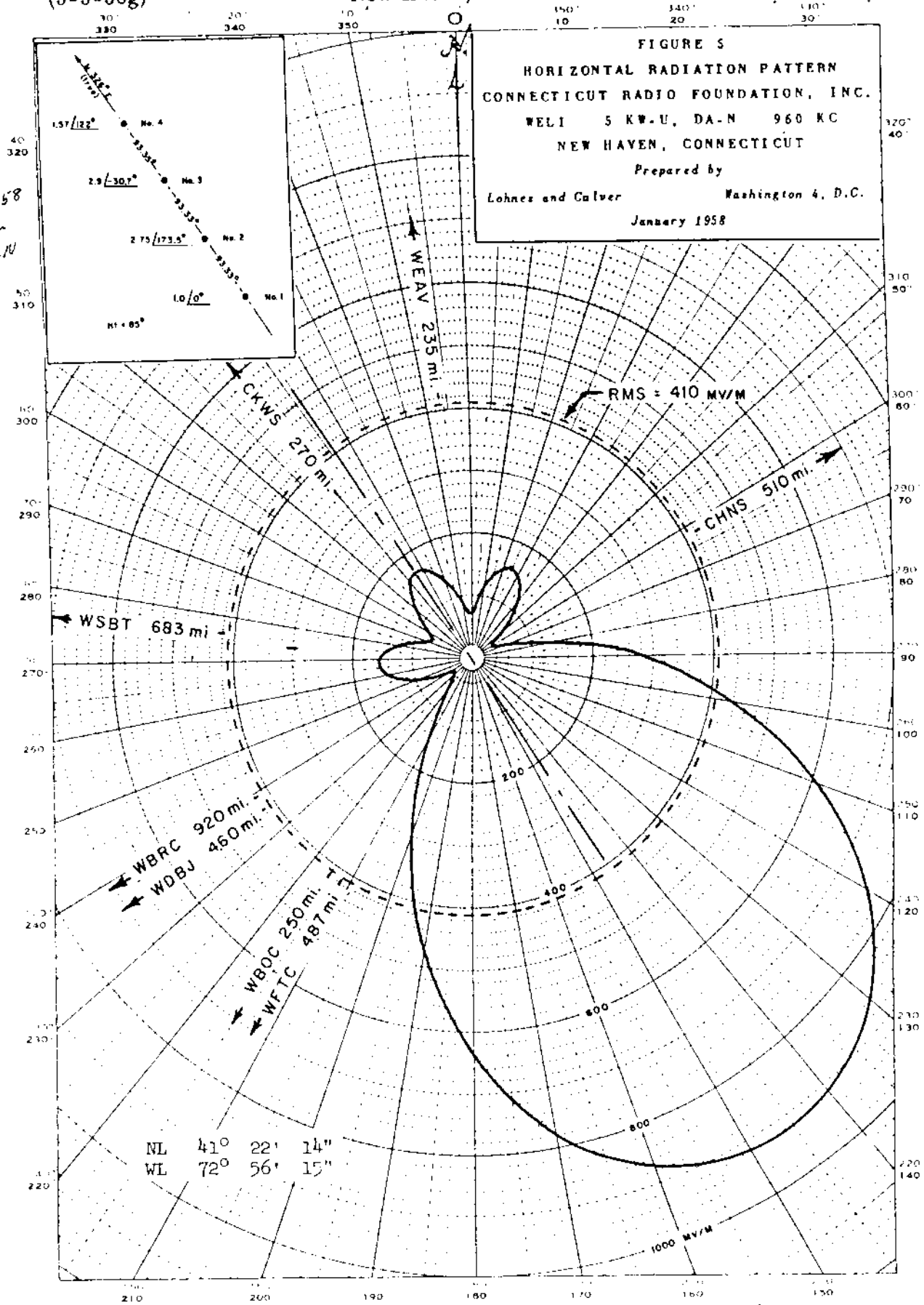
FIG. 17
MEASURED DAYTIME PATTERN
WELI 1 KW, DA-N 960 KC
NEW HAVEN, CONNECTICUT
Prepared by
Lohnes & Culver Wash. 4, D.C.
September 1947

WELI

PROPOSED NIGHT
(3-3-58g)

Station WELI
New Haven, Connecticut

5kw, DA-N,U
960 KC



Granted CP 11/19/58 for increase in nite to 5 DA-N

FCC File No. BP-11,815
Accepted 2-24-58

WELI
New Haven, Connecticut

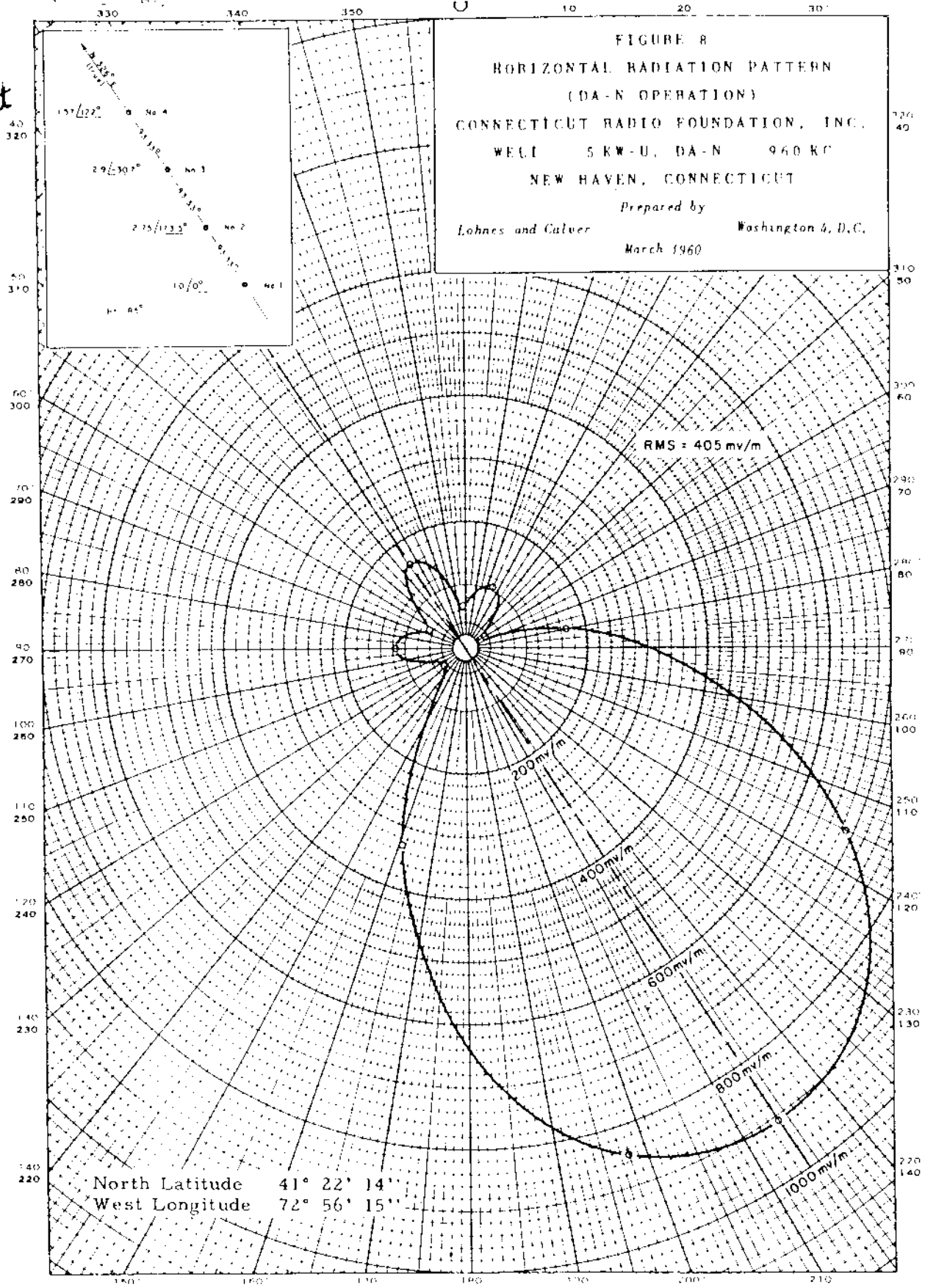
960 KC

WELI

MEASURED NIGHT
(5-27-60g)

Station WELI 5kw, DA-N,U
New Haven, Connecticut 960 KC

1-18-60
Permission for increase in light power



FCC File No. BL-7888
Accepted 5-3-60

WELI
New Haven, Connecticut 960 KC

WELI

MEASURED NON-DA
(5-27-60g)

Station WELI
New Haven, Connecticut

5kw, DA-N,U
960 KC

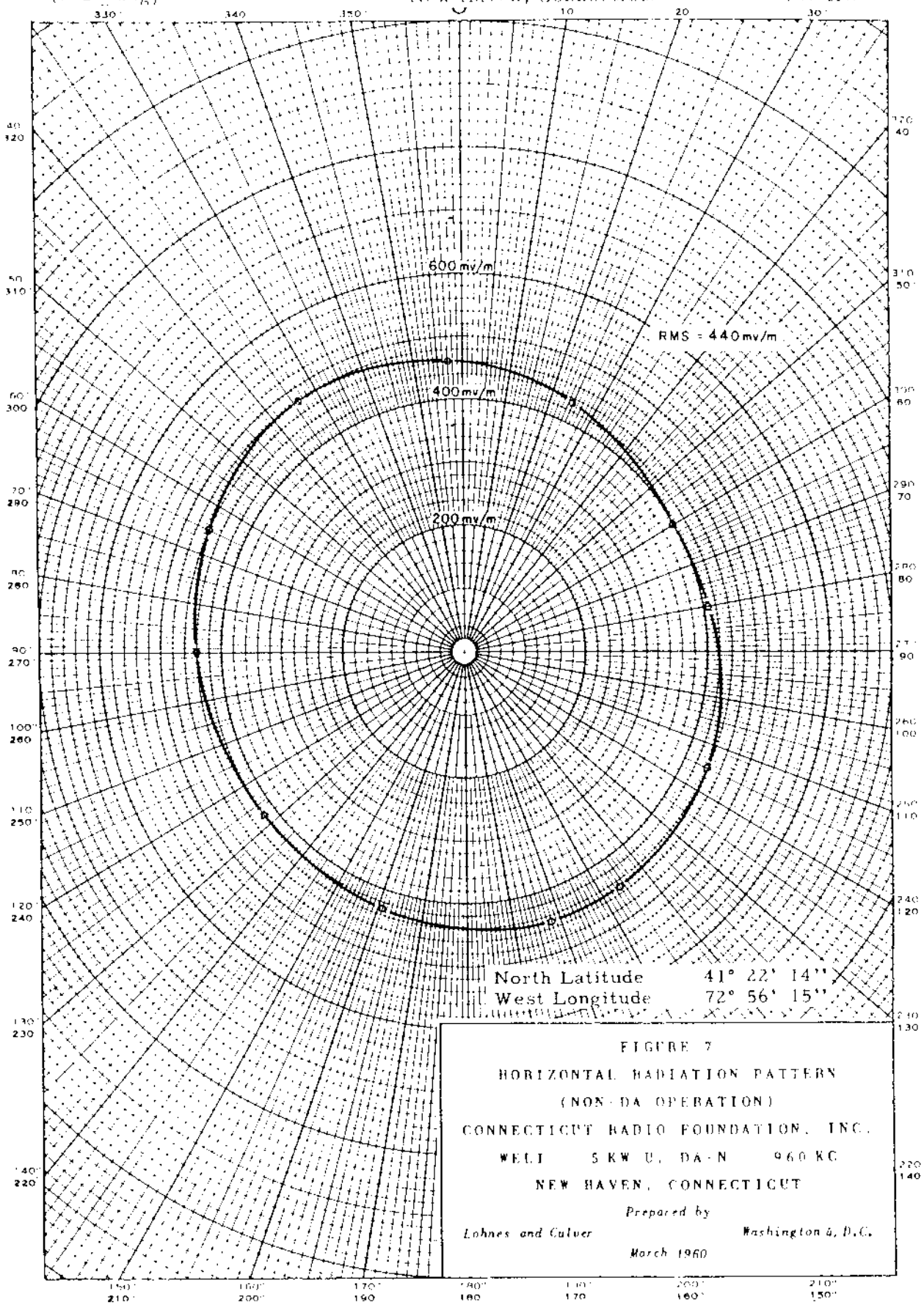


FIGURE 7
HORIZONTAL RADIATION PATTERN
(NON-DA OPERATION)
CONNECTICUT RADIO FOUNDATION, INC.
WELI 5 KW U, DA-N 960 KC
NEW HAVEN, CONNECTICUT
Prepared by
Lohnes and Culver *Washington 4, D.C.*
March 1960

FCC File No. BL-7888
Accepted 5-3-60

WELI
New Haven, Connecticut

960 KC

WFGL
960 kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WFGL

Main Studio: Fitchburg, Massachusetts

Frequency: 960 kHz

Power: 1kw Night 2.5kw Day

Notification List No. 1788

Date: August 22, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 42° 35' 24"
West Longitude: 71° 49' 41"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 4
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	SE(#1)	SC(#2)	NC(#3)	NW(#4)
INSULATORS:	250'	250'	250'	250' (87.8°)
NIGHT PHASING:	0°	+166.9°	-36.4°	+124.7°
NIGHT FIELD RATIO:	1.0	1.75	1.445	0.466
DAY PHASING:	0°	+200.85°	+100°	—
DAY FIELD RATIO:	1.0	1.674	0.509	—

SPACING AND ORIENTATION: Adjacent towers in a row are spaced 256.14' (90°) on a line bearing 317.5° true.

GROUND SYSTEM: 120 - 260' equally spaced copper radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	298.2 mv/m	381.0 mv/m	313.2 mv/m
Night	191 mv/m		

WFGL
960kHz

Note: Please retain the Nighttime directional antenna radiation pattern notified for Station WFGL in United States Change List Number 757 dated May 7, 1958 and attach to this Revised Description Sheet and Daytime pattern. This notification concerns only a change in the Daytime operation of the station with Nighttime operation continued as previously notified.

WFGL
960 kHz
DA-D

AMENDED STANDARD PATTERN

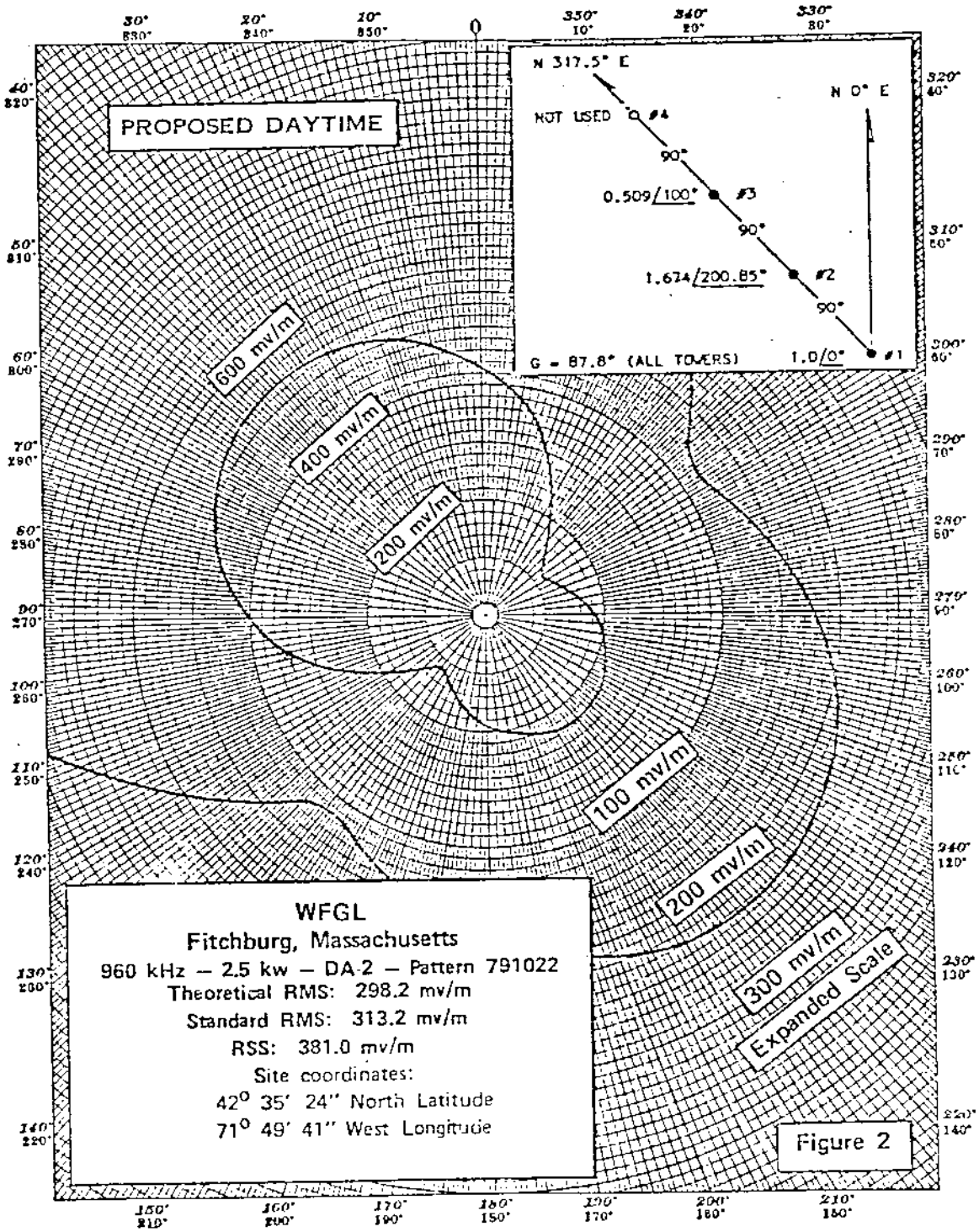


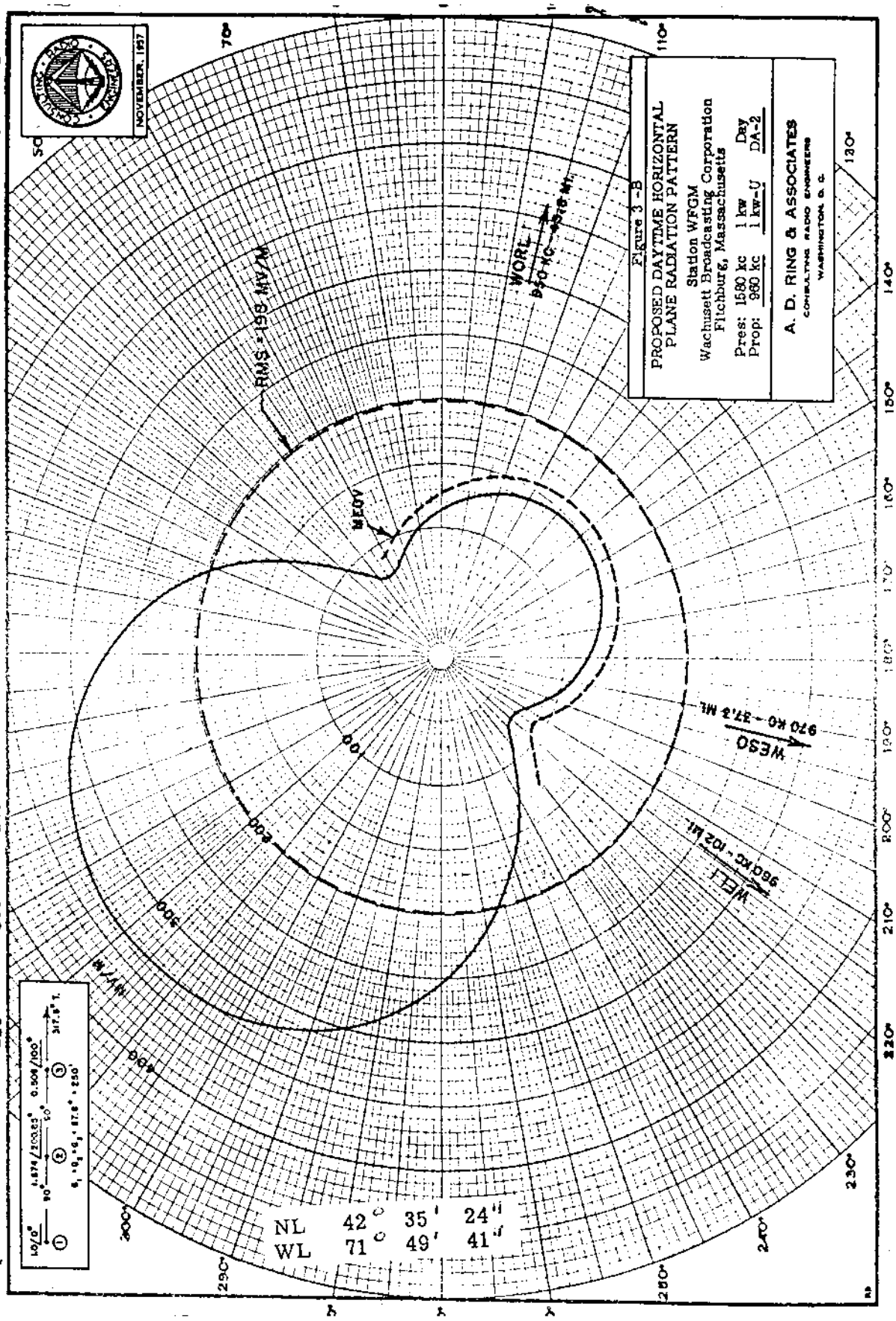
Figure 2

~~WFGM~~
WFGL

PROPOSED DAY
(10-20-57g)

Station WFGM 1kw, DA-2,U
Fitchburg, Massachusetts 960 KC

Granted CP (5/7/58) for change in freq. increase in hrs. + for DA system



FCC File No. BP-11,145 WFGM
Accepted 12-6-57 (Amended) Fitchburg, Massachusetts 960 KC

~~WFGM~~
WFGL

MEASURED DAY
(3-23-59g)

Station WFGM
Fitchburg, Massachusetts

1kw, DA-2,U
960 KC

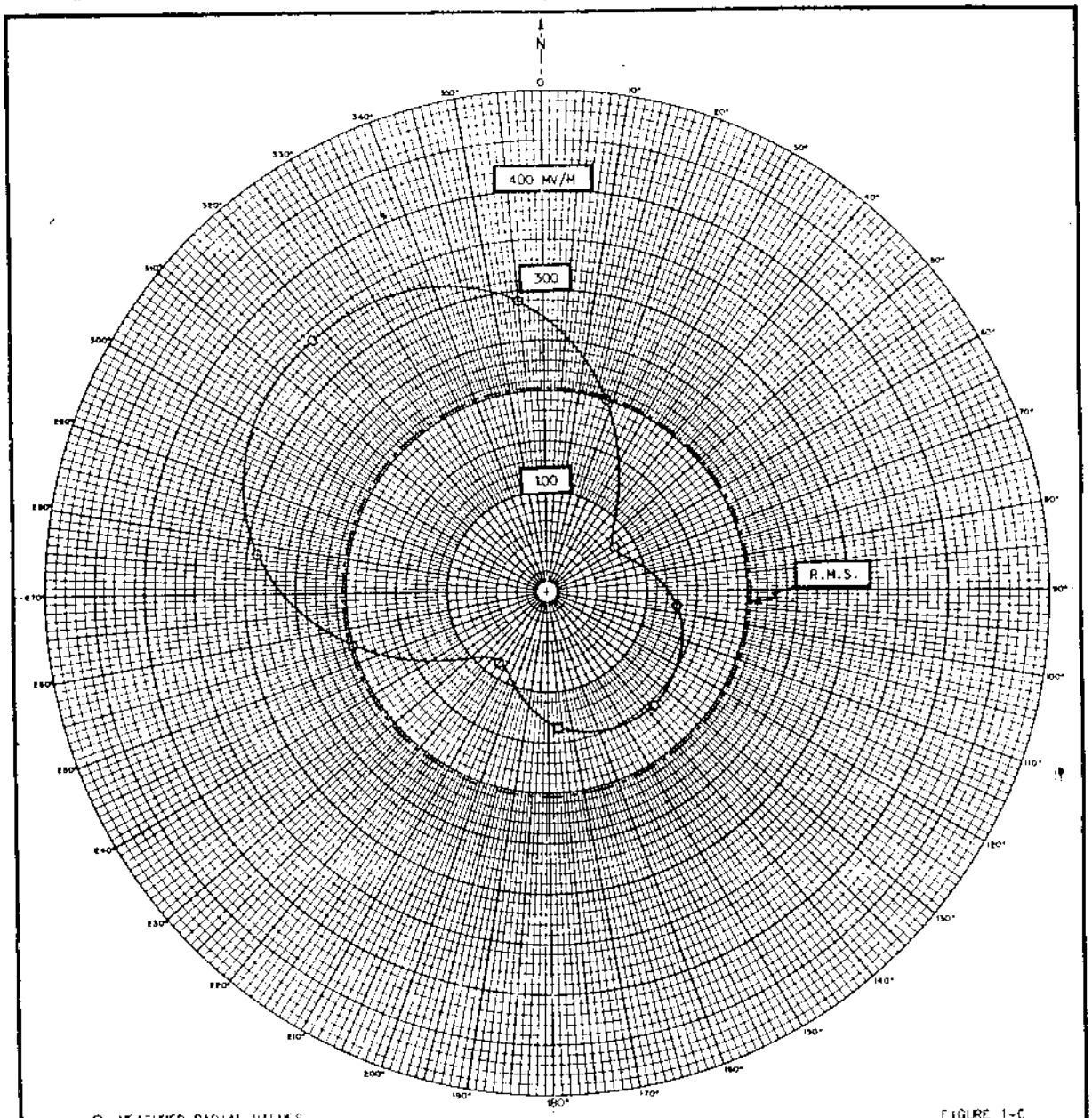
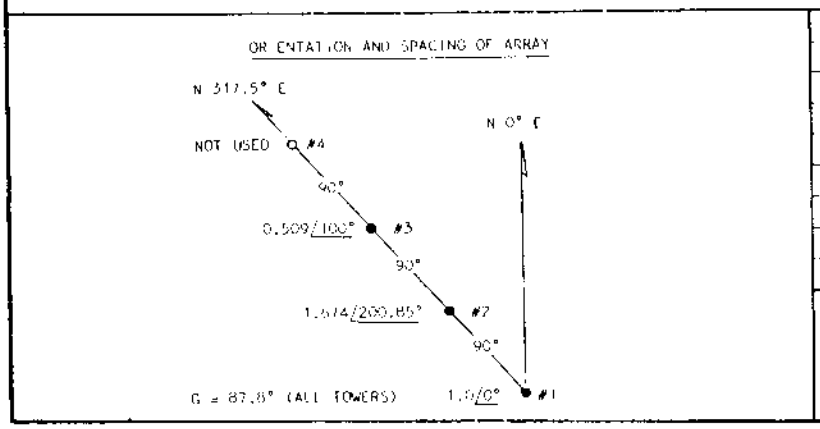


FIGURE 1-C

HORIZONTAL RADIATION PATTERN



APPLICANT	THE WACHUSETT BCSTG. CORP.
LOCATION	FITCHBURG, MASS. (WFGM)
FREQUENCY	960 KC/S
POWER	1 KW-U (DA-2)
LATITUDE	42 DEG 35 MIN 24 SEC.
LONGITUDE	71 DEG 49 MIN 45 SEC
WHEN USED	DAYTIME
RMS FIELD	203 MV/M
DATE	DECEMBER 1958

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7367
Accepted 2-17-59

WFGM
Fitchburg, Massachusetts

960 KC

~~WIGM~~
WFGL

PROPOSED NIGHT (12-20-57g) | Station WFGM Fitchburg, Massachusetts | 1kw, DA-2,U 960 KC

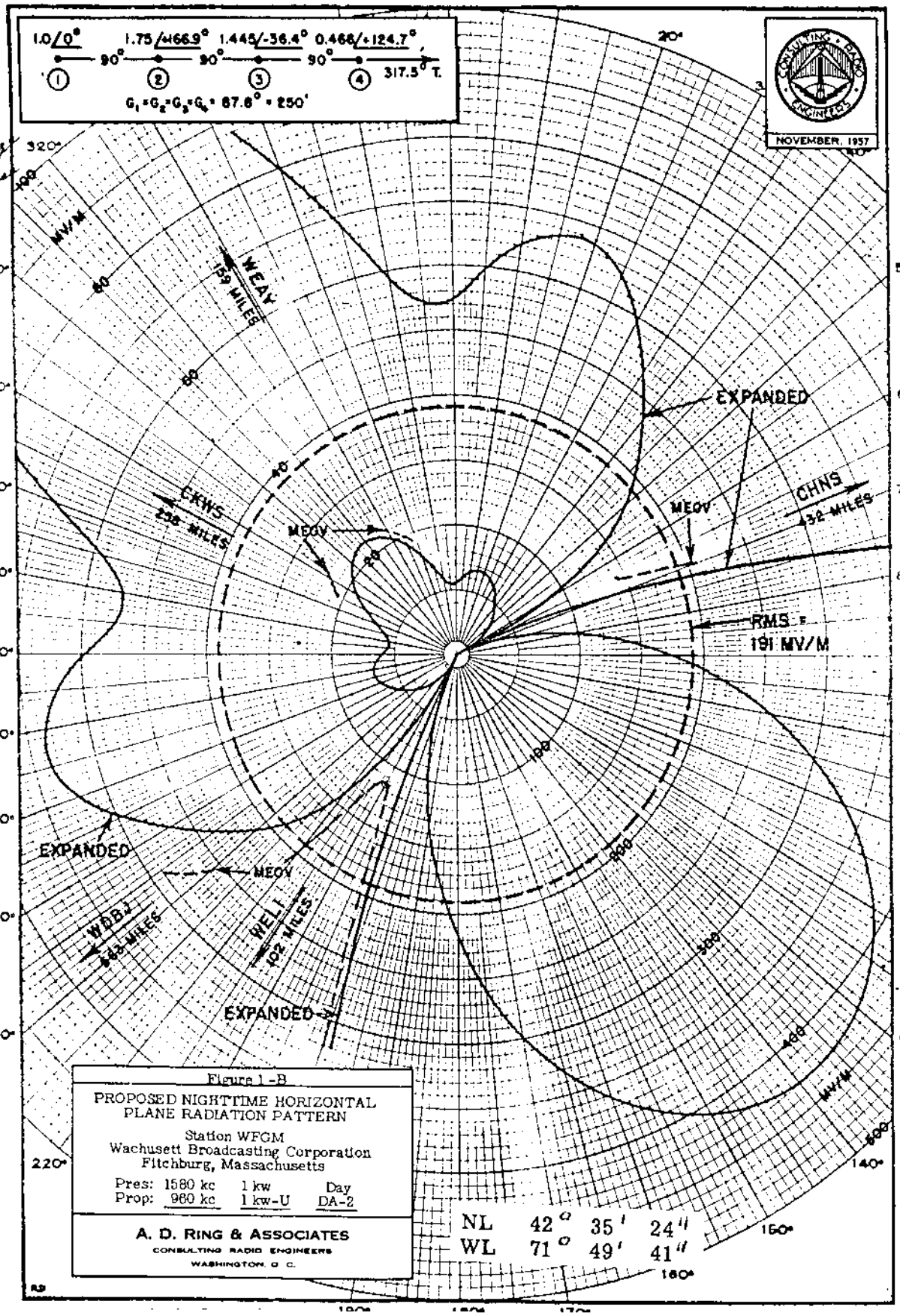


Figure 1-B

PROPOSED NIGHTTIME HORIZONTAL PLANE RADIATION PATTERN

Station WFGM
Wachusett Broadcasting Corporation
Fitchburg, Massachusetts

Pres: 1580 kc 1 kw Day
Prop: 960 kc 1 kw-U DA-2

A. D. RING & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

A. D. RING & CO - 1/52 - 1000

FCC File No. BP-11,145 WFGM
Accepted 12-6-57 (Amended) Fitchburg, Massachusetts 960 KC

~~WFGM~~
WFGL

MEASURED NIGHT
(3-23-59g)

Station WFGM
Fitchburg, Massachusetts

1kw, DA-2,U
960 KC

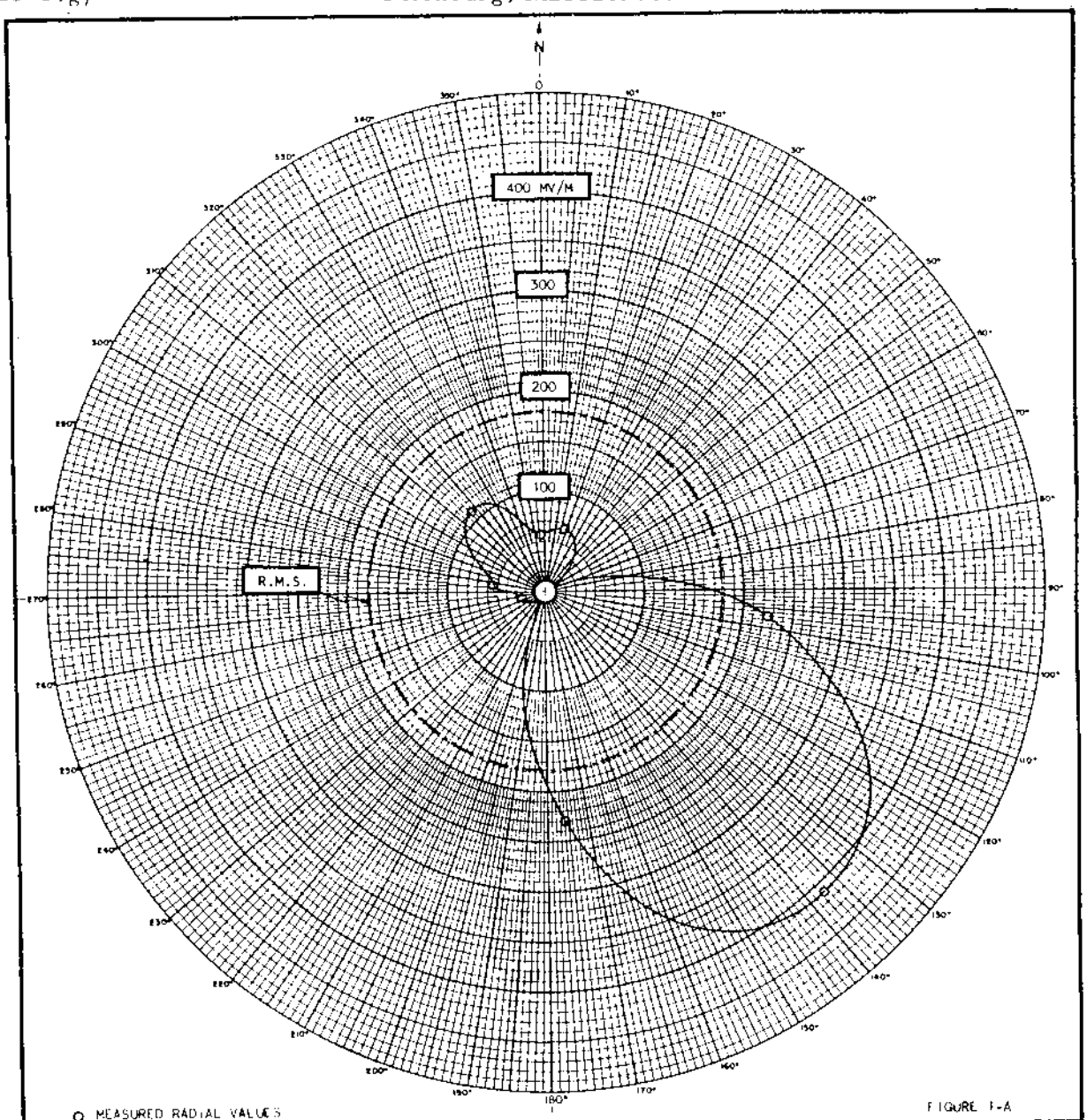
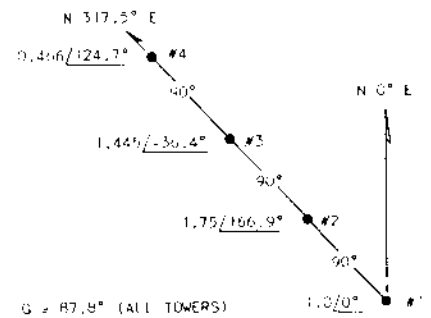


FIGURE 1-A

HORIZONTAL RADIATION PATTERN

ORIENTATION AND SPACING OF ARRAY



APPLICANT	THE WACHUSETT BCSTG. CORP.
LOCATION	FITCHBURG, MASS. (WFGM)
FREQUENCY	960 KC/S
POWER	1 KW-U (DA-2)
LATITUDE	42 DEG 35 MIN 24 SEC.
LONGITUDE	71 DEG 49 MIN. 43 SEC.
WHEN USED	NIGHTTIME
RMS FIELD	178 MV/M
DATE	DECEMBER 1958

ROBERT M. SILLIMAN & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7367
Accepted 2-17-59

WFGM
Fitchburg, Massachusetts

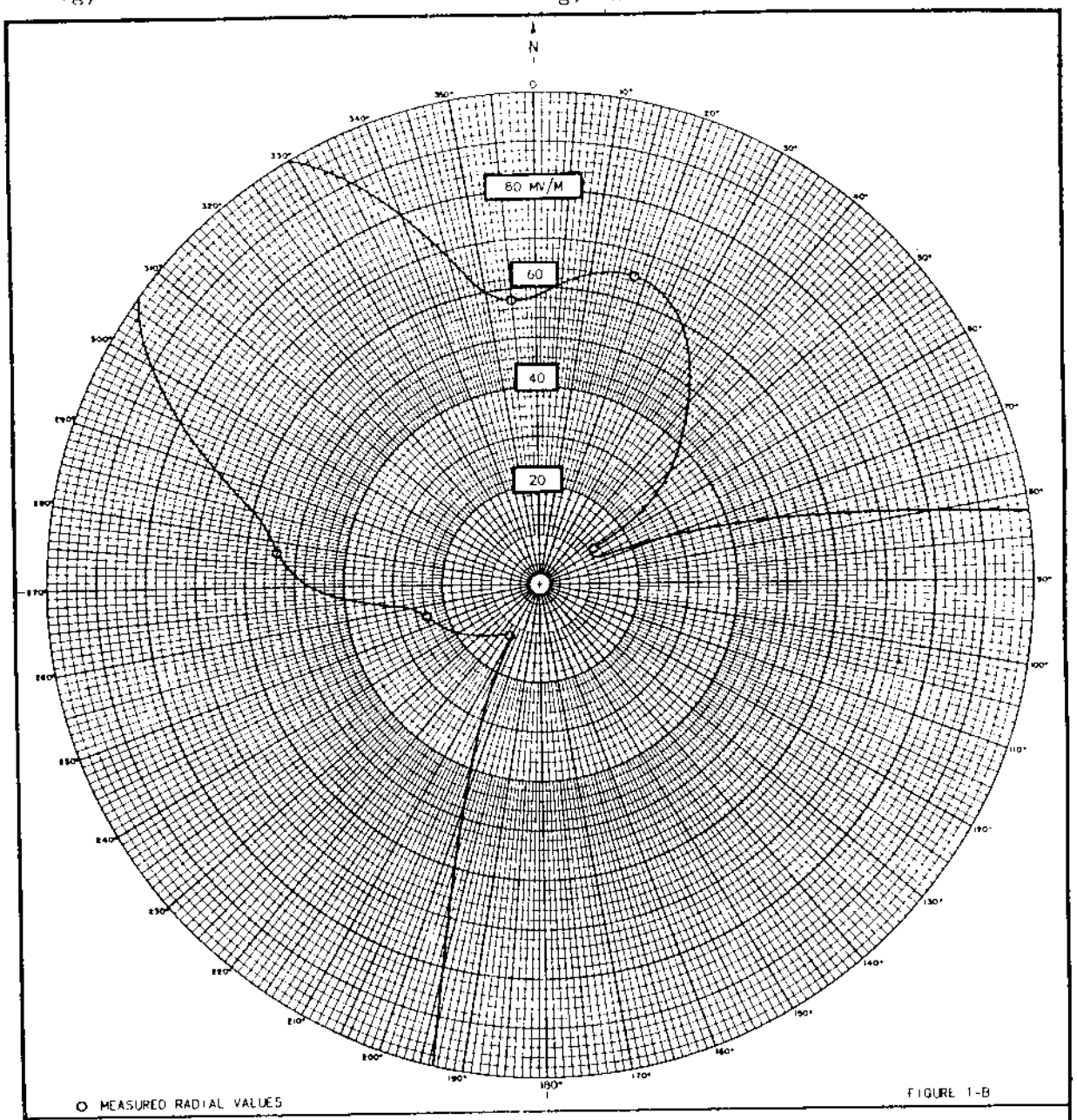
960 KC

~~WFGM~~
WFGL

MEASURED NIGHT NULLS
(3-23-59g)

Station WFGM
Fitchburg, Massachusetts

1kw, DA-2,U
960 KC



O MEASURED RADIAL VALUES

FIGURE 1-B

HORIZONTAL RADIATION PATTERN

EXPANDED VIEW

APPLICANT : THE WACHUSETT BCSTG. CORP.
LOCATION : FITCHBURG, MASS. (WFGM)
FREQUENCY : 960 KC/S
POWER : 1 KW-U (DA-2)
LATITUDE : 42 DEG 35 MIN 24 SEC
LONGITUDE : 71 DEG 49 MIN. 43 SEC
WHEN USED : NIGHTTIME
R.M.S. FIELD : 178 MV/M
DATE : DECEMBER 1958

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7367
Accepted 2-17-59

WFGM
Fitchburg, Massachusetts

960 KC

~~WFGM~~
WFGL

MEASURED NON-DA
(3-23-59g)

Station WFGM
Fitchburg, Massachusetts

1kw, DA-2,U
960 KC

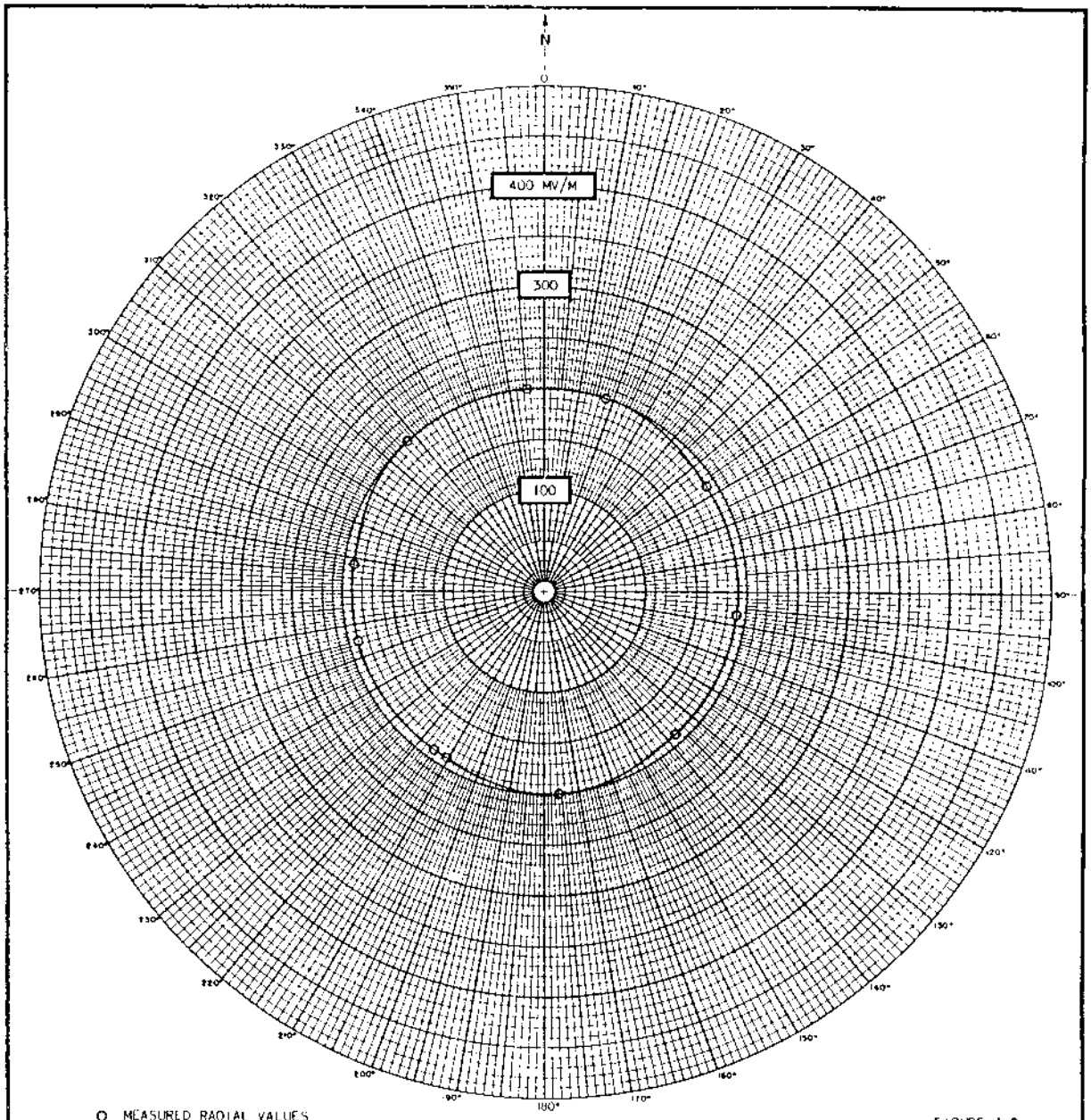


FIGURE 1-D

HORIZONTAL RADIATION PATTERN

NON-DIRECTIONAL SURVEY

APPLICANT	THE WACHUSETT BCSTG. CORP.
LOCATION	FITCHBURG, MASS.
FREQUENCY	960 KC/S
POWER	1 KW-U (DA-2)
LATITUDE	42 DEG 35 MIN 24 SEC
LONGITUDE	71 DEG 49 MIN 43 SEC.
WHEN USED	NON-DIRECTIONAL SURVEY ONLY
R.M.S. FIELD	195 MV/M
DATE	DECEMBER 1958

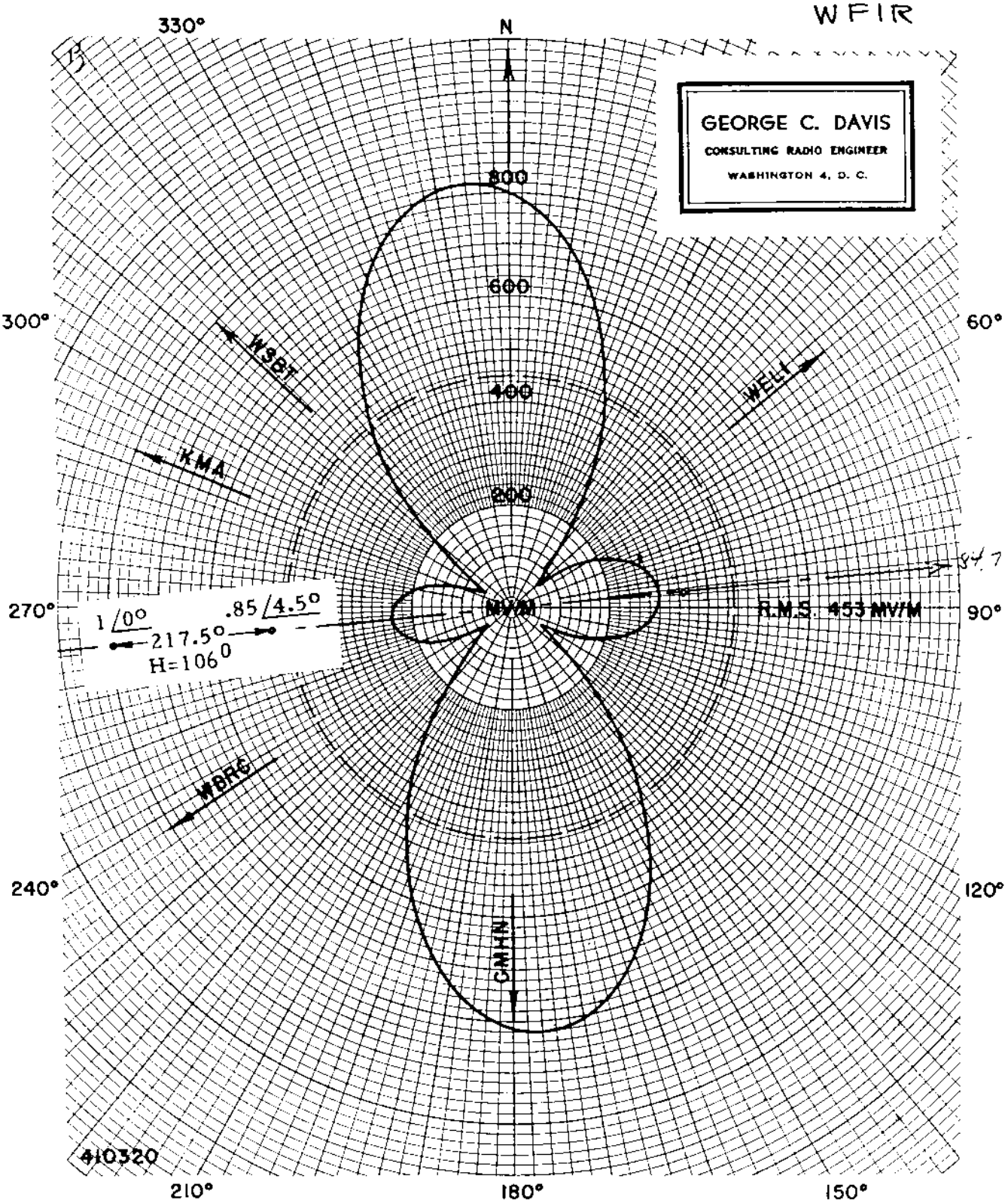
SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7367
Accepted 2-17-59

WFGM
Fitchburg, Massachusetts

960 KC

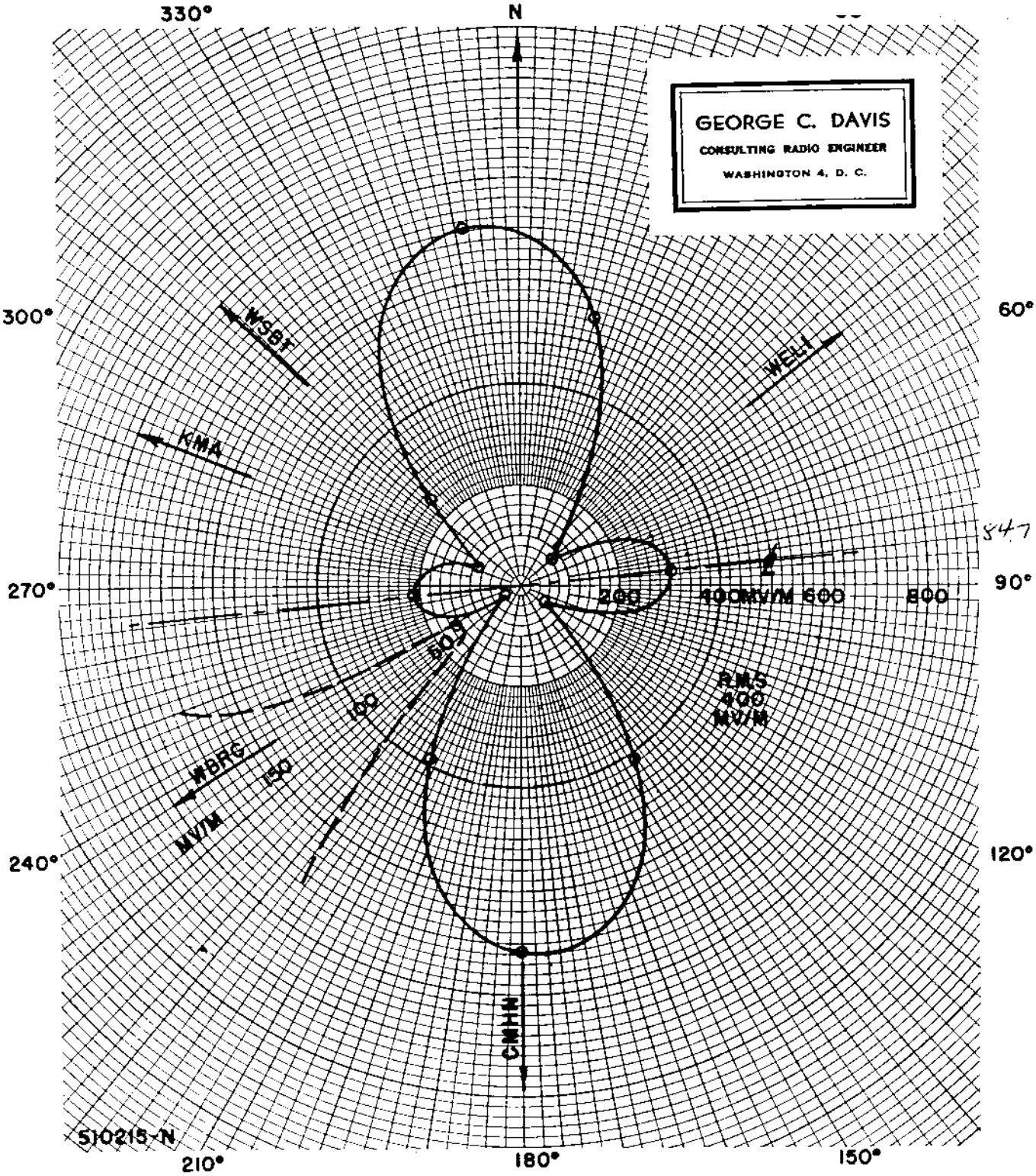
WFIR



GEORGE C. DAVIS
CONSULTING RADIO ENGINEER
WASHINGTON 4, D. C.

COMPUTED NIGHTTIME
HORIZONTAL PLANE PATTERN
UNATTENUATED FIELD AT ONE MILE
WDBJ, ROANOKE, VIRGINIA
WFIR 960 KC, 5 KW, DA-N
FEBRUARY 1951

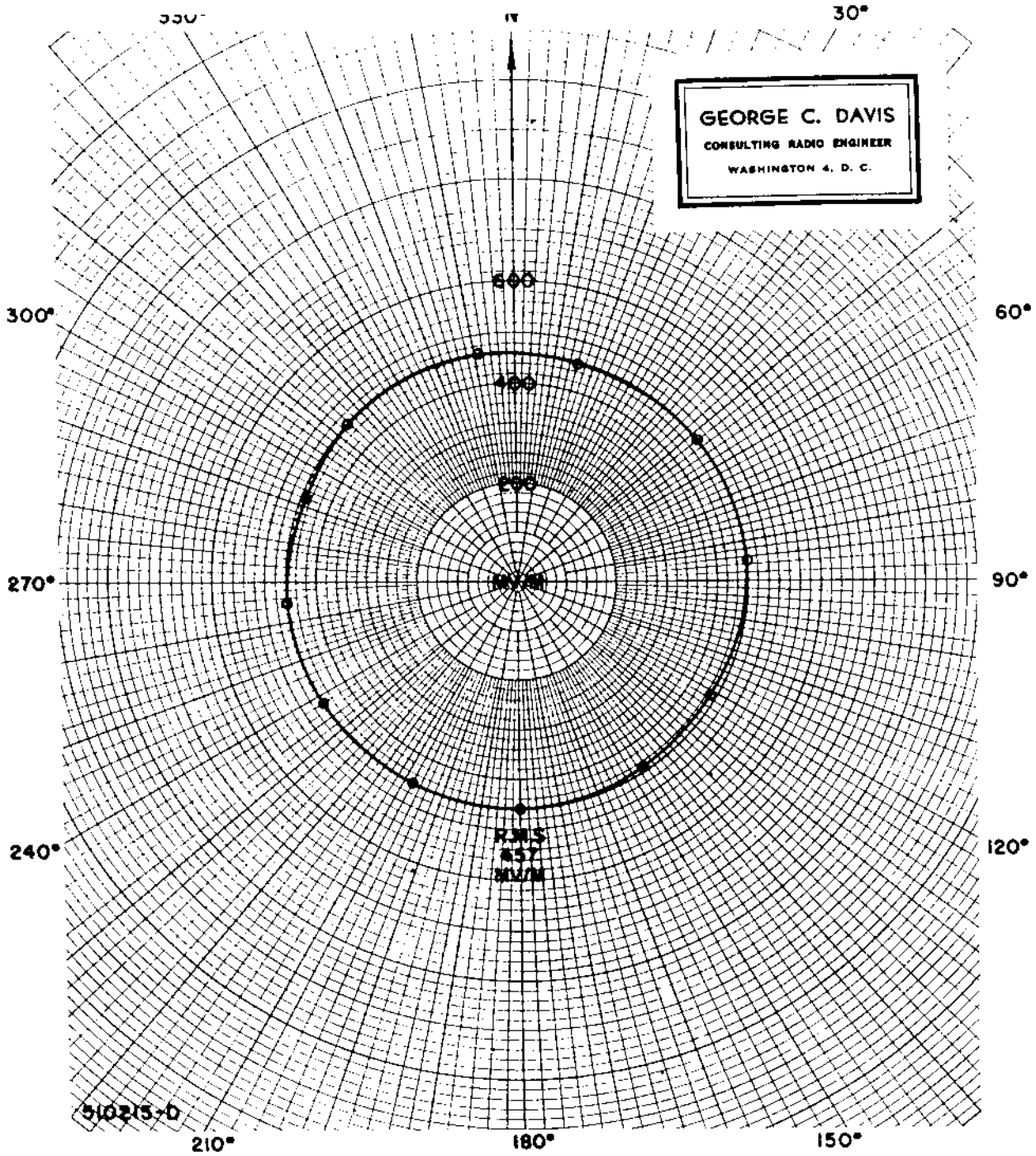
WFIR



MEASURED NIGHTTIME
HORIZONTAL PLANE PATTERN
UNATTENUATED FIELD AT ONE MILE
WDBJ, ROANOKE, VIRGINIA
960 KC, 5 KW, DA-N
FEBRUARY 1951

WFIR

MEASURED WDBJ, Roanoke, Virginia 5KW, DA-N 960 kc
NON-DA (5/4/54G)

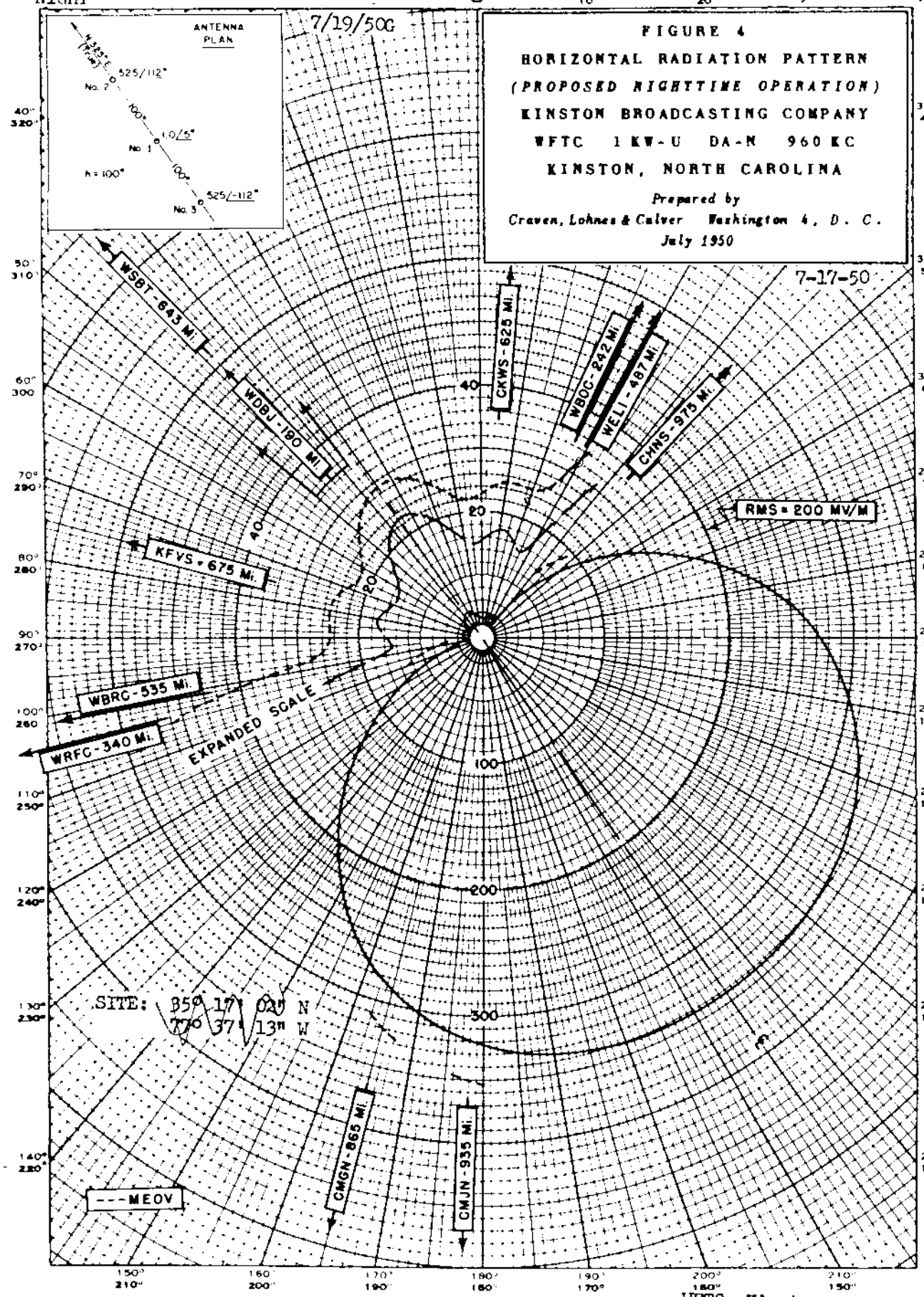


MEASURED NON-DIRECTIVE
UNATTENUATED FIELD AT ONE MILE
WDBJ, ROANOKE, VIRGINIA
960 KC, 5 KW, DA-N
FEBRUARY 1951

FCC File No. BZ-3203 Accepted 2/23/51 WDBJ, Roanoke, Virginia 960 kc

WFTC

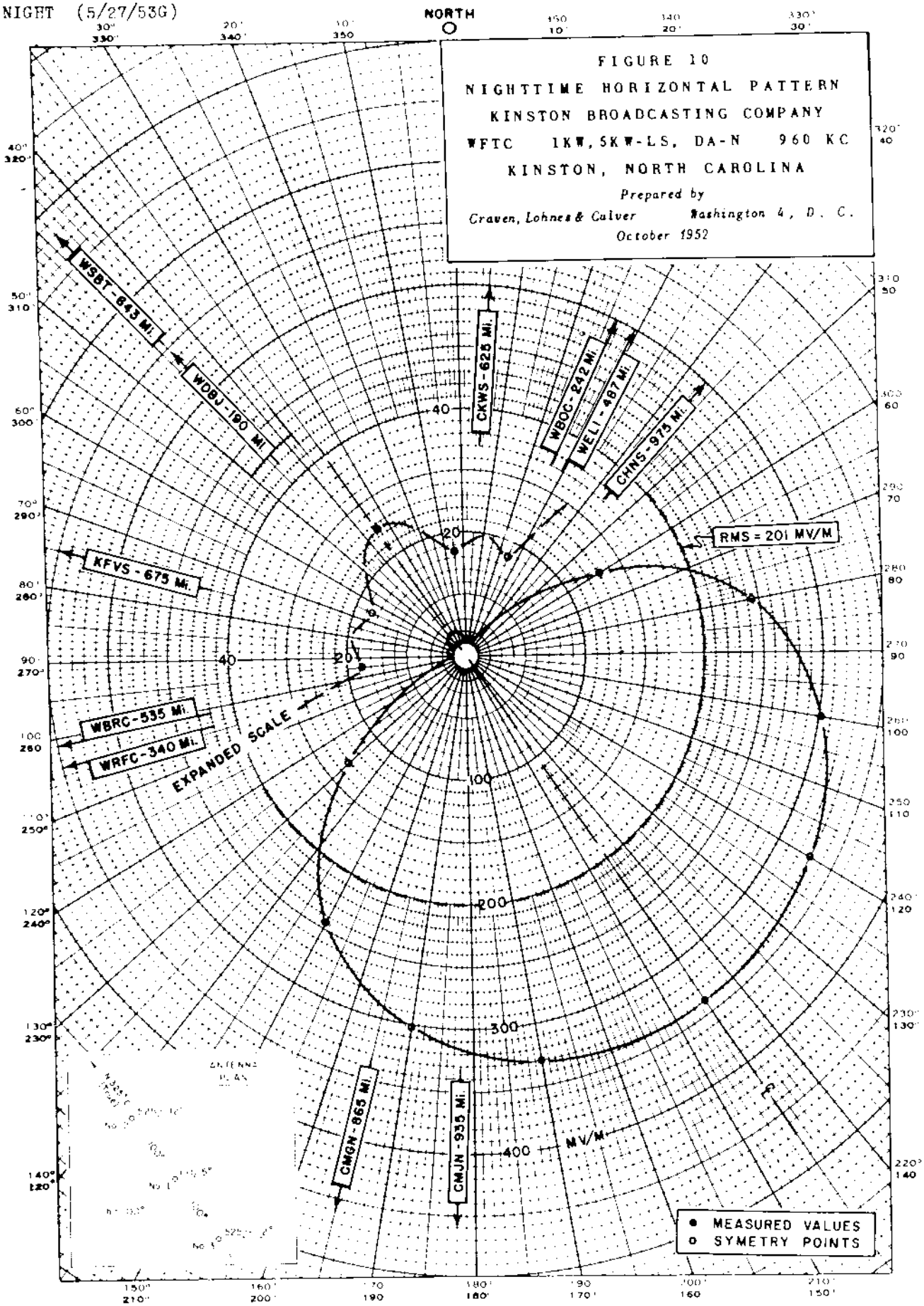
PROPOSED NIGHT — WFTC, KINSTON, N. C. — NORTH — 1kw, DAN — 960 kc



WFTC, Kinston, N. C. 960 kc

WFTC

MEASURED WFTC, KINSTON, N. C. 1kw, 5kw-LS, DA-N 960 kc
NIGHT (5/27/53G)



FCC FILE NO. BL-4964 Accepted 4/7/53 WFTC, Kinston, N. C. 960 kc

WGRO

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station : WGRO

Main Studio: Lake City, Florida

Frequency : 960 KHz

Power : 1 kW Night 0.5 kW Day

Notification : 1780

Date : Sept. 28, 1979

Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude:	30	10	33
West Longitude:	82	40	18

PREDICTED DAYTIME EFFECTIVE FIELD (omnidirectional): 130 mV/m at rated power.

NIGHTTIME ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 2
Type of elements : Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER :	S(#1)	N(#2)				
HEIGHT ABOVE INSULATORS :	240'	240'	(84.3°)			
PHASING :	0°	+47°				
FIELD RATIO :	1	0.85				

SPACING AND ORIENTATION : Towers in a row are spaced 455.4' (160°) on a line bearing 338° true.

GROUND SYSTEM : 120 - 190' to 250' equally spaced copper radials plus a 48' square ground screen about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers.

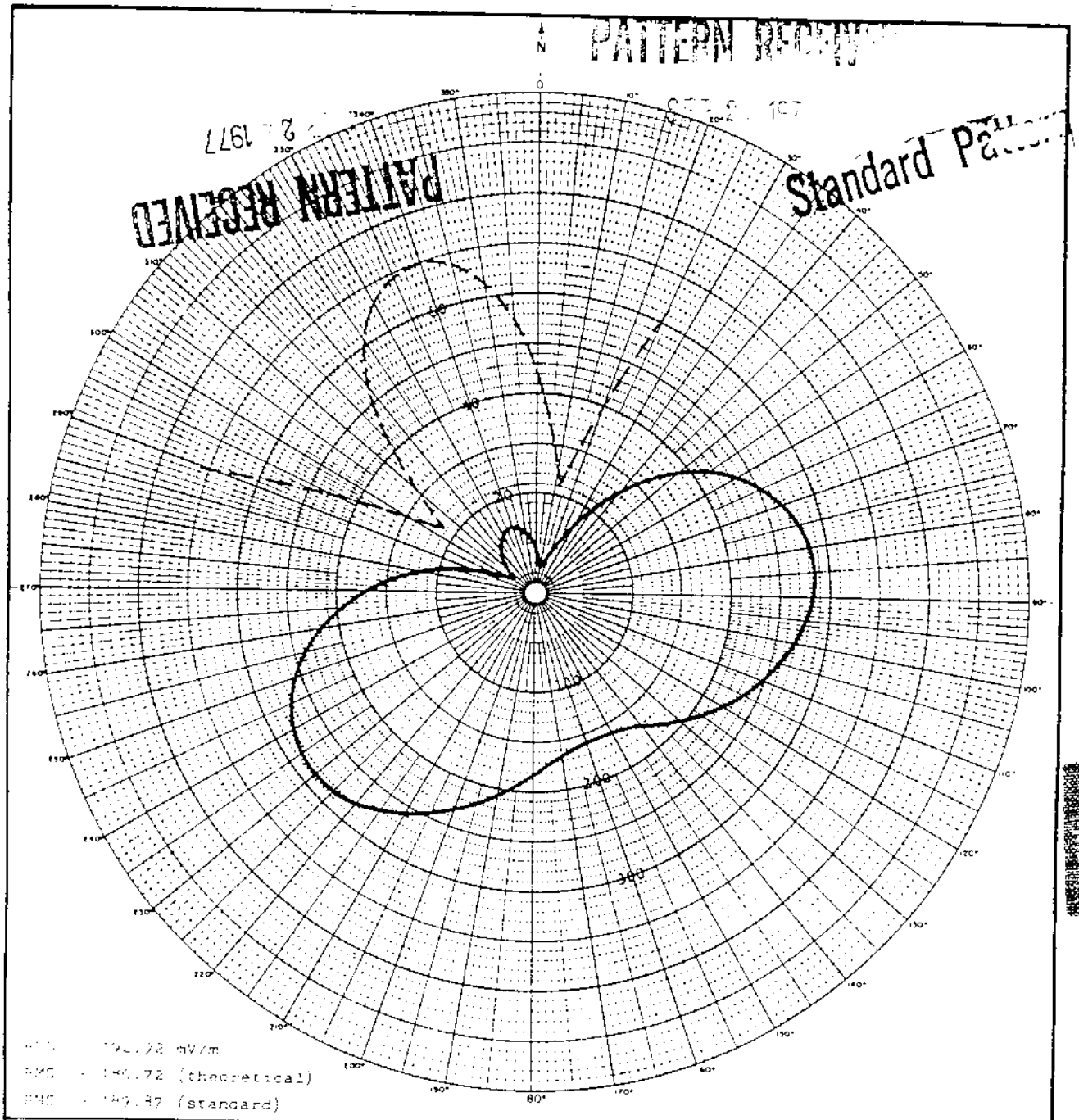
WGRO

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Night	180.72 mV/m	192.92 mV/m	189.97 mV/m

Note: This notification concerns only the addition of Nighttime operation to the station with Daytime oepration continued as previously notified.

WGRO



HORIZONTAL RADIATION PATTERN

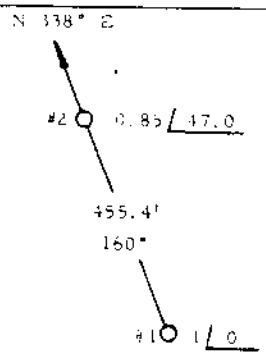


FIG. 4 (REV.)
WGRO RADIO INC.
RADIO STATION WGRO
LAKE CITY, FLORIDA
960 KHz 1.0-0.5KW LS U DA, N
HORIZONTAL RADIATION PATTERN

WHYL

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WHYL

Main Studio: Carlisle, Pennsylvania

Frequency: 960 kHz

Power: 5 kW

Notification List No. 1652

Date: October 1, 1975

Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 40° 11' 34"
West Longitude: 77° 10' 28"

ANTENNA CHARACTERISTICS

Authorized for Daytime operation. (DA-D)
Number of elements: 2
Type of elements: Series-excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	NW(#2)	SE(#1)	
HEIGHT ABOVE INSULATORS:	265'	265'	(93.1°)
PHASING:	+16°	0°	
FIELD RATIO:	0.6	1.0	

SPACING AND ORIENTATION: Elements are spaced 569.2'(200°) on a line bearing 343° true.

GROUND SYSTEM: 120-260' equally spaced copper radials about each tower.

Predicted effective Field: 395 mv/m at rated power.

Note: This notification concerns changes in meovs of radiation in the directional antenna pattern and in antenna height.

COH4L

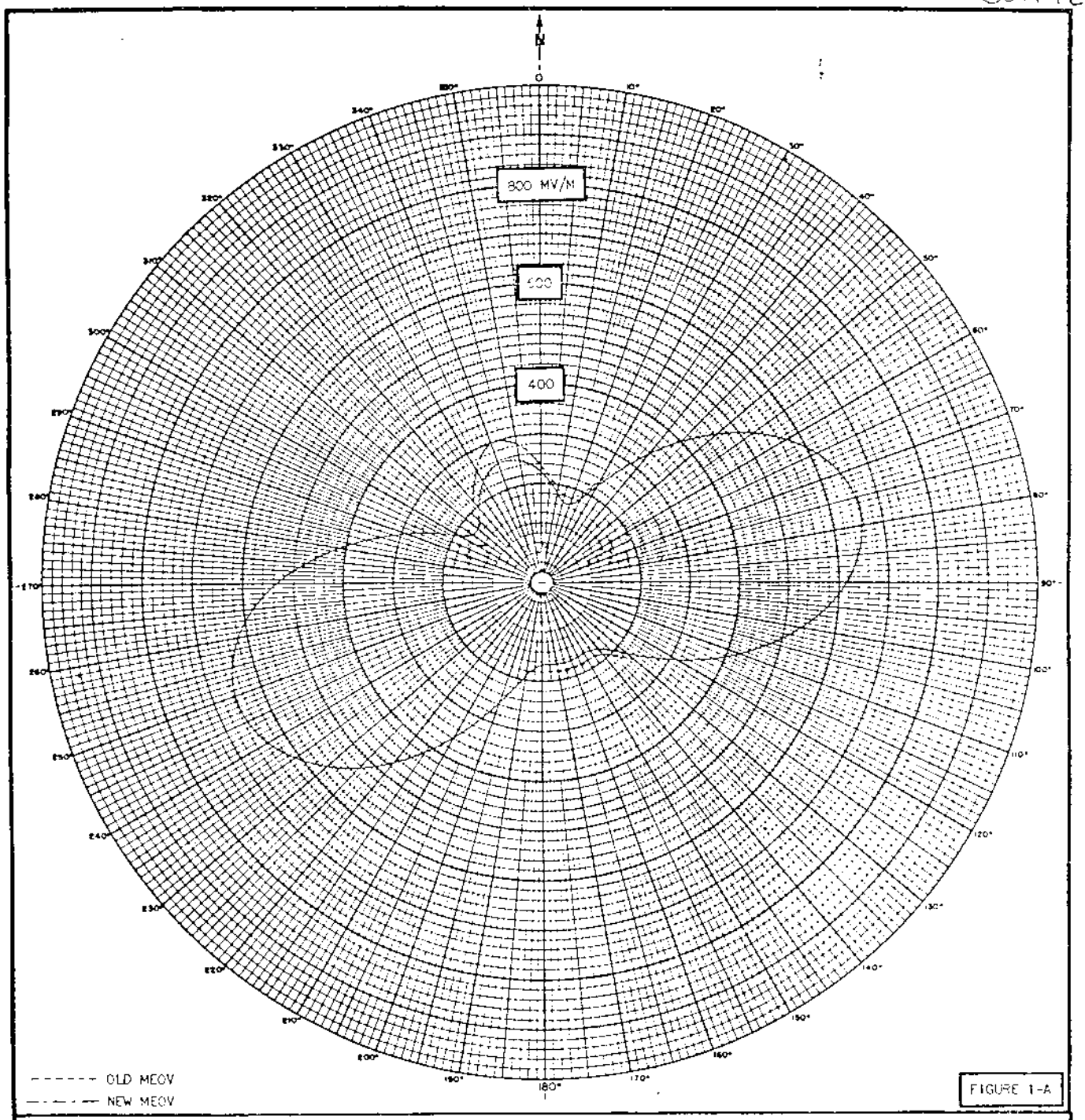
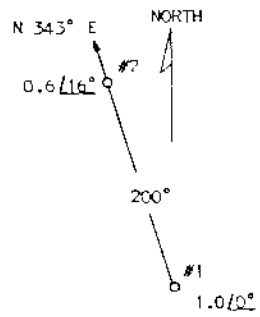


FIGURE 1-A

HORIZONTAL RADIATION PATTERN

ORIENTATION AND SPACING OF ARRAY



G = 93.1°

APPLICANT	RICHARD FIELD LEWIS, JR., INC.
LOCATION	CARLISLE, PA. (WHYL)
FREQUENCY	960 KC/S
POWER	5 KW-D(DA)
LATITUDE	40 DEG 11 MIN. 54 SEC.
LONGITUDE	77 DEG 10 MIN 25 SEC.
WHEN USED	DAYTIME
R.M.S. FIELD	595 MV/M (THEORETICAL)
DATE	MARCH 1975

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
710 FOURTEENTH STREET N.W.
WASHINGTON D.C. 20005

/

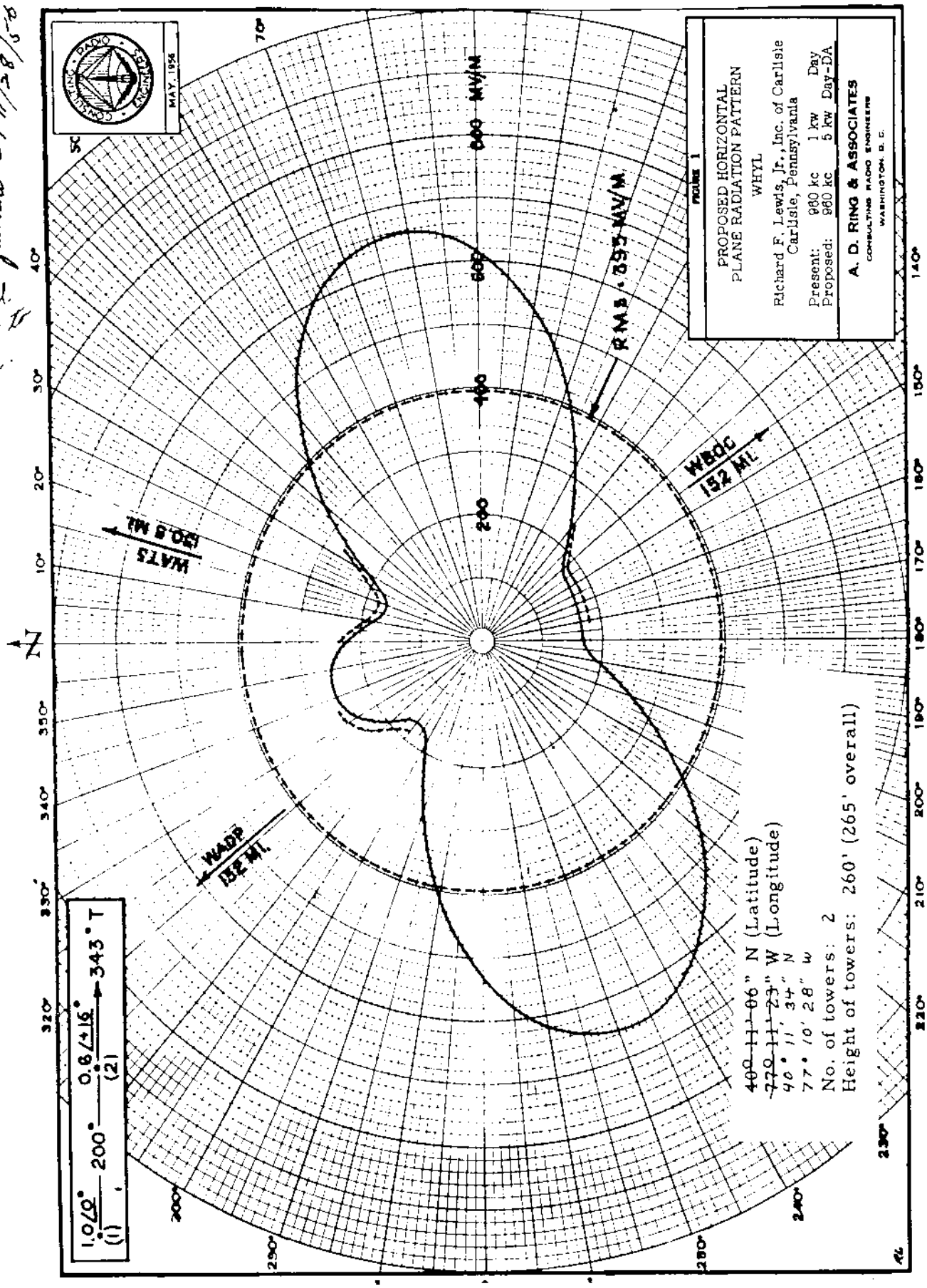
WHYL

PROPOSED
DAY (6-20-56g)

STATION WHYL
CARLISLE, PA.

5 KW
DA-D, D

960 KC



granted CP 11/28/56

granted mod. of CP 4/30/58 to change trans. location (see below)

FCC File No. BP-10,621 Accepted 6-12-56 WHYL, Carlisle, Pa. 960 KC

MEASURED DAY
(12-12-58g)

Station WHYL
Carlisle, Pennsylvania

5kw, DA-D, D
960 KC

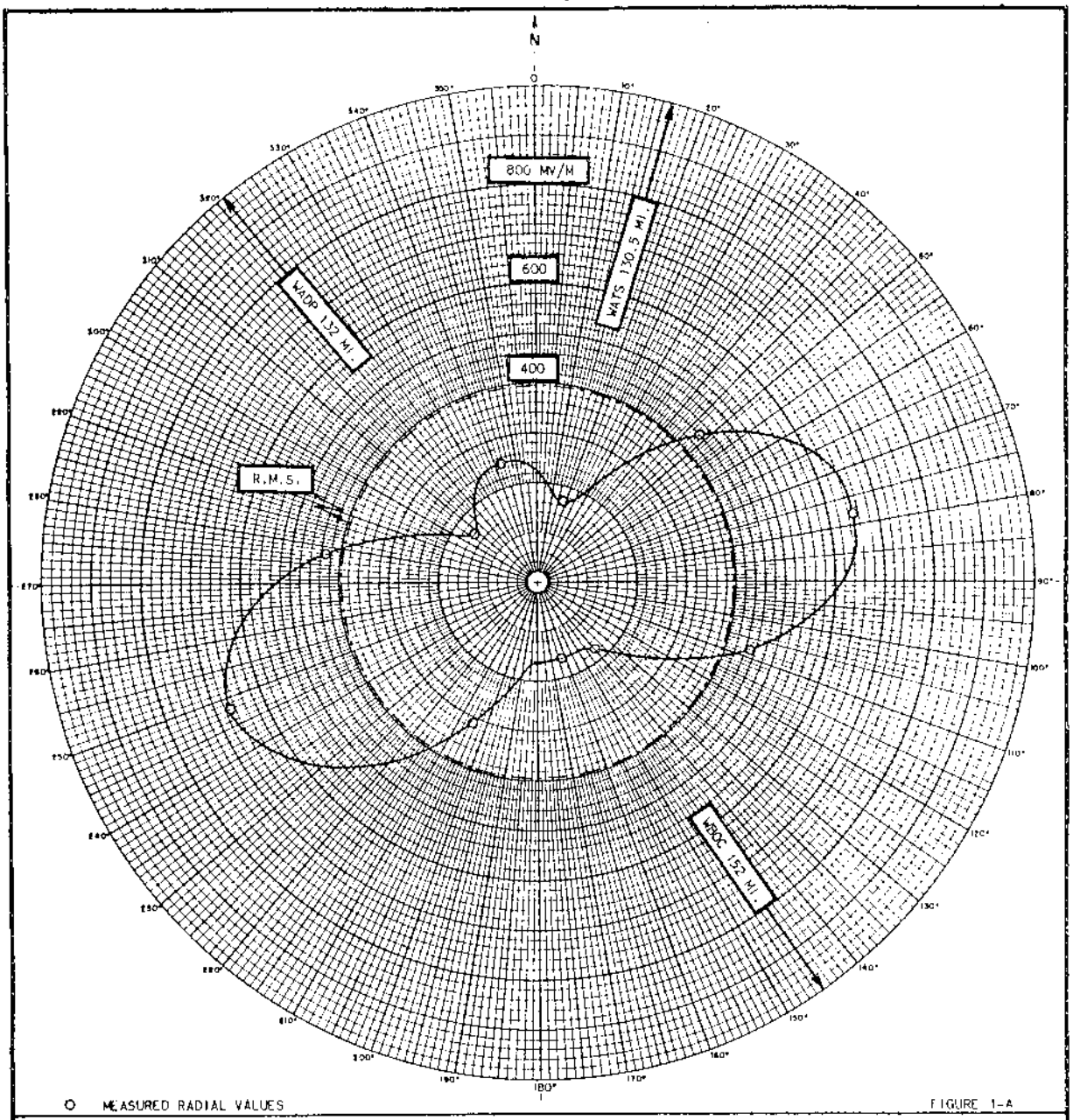
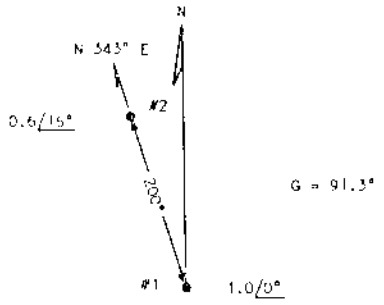


FIGURE 1-A

HORIZONTAL RADIATION PATTERN

ORIENTATION AND SPACING OF ARRAY



APPLICANT	RICHARD FIELD LEWIS, JR., INC.
LOCATION	CARLISLE, PENNSYLVANIA (WHYL)
FREQUENCY	960 KC/S
POWER	5 KW-D(DA)
LATITUDE	40 DEG 13 MIN 34 SEC
LONGITUDE	77 DEG 10 MIN 28 SEC
WHEN USED	DAYTIME
R.M.S. FIELD	395 MV/M
DATE	OCTOBER 1958

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

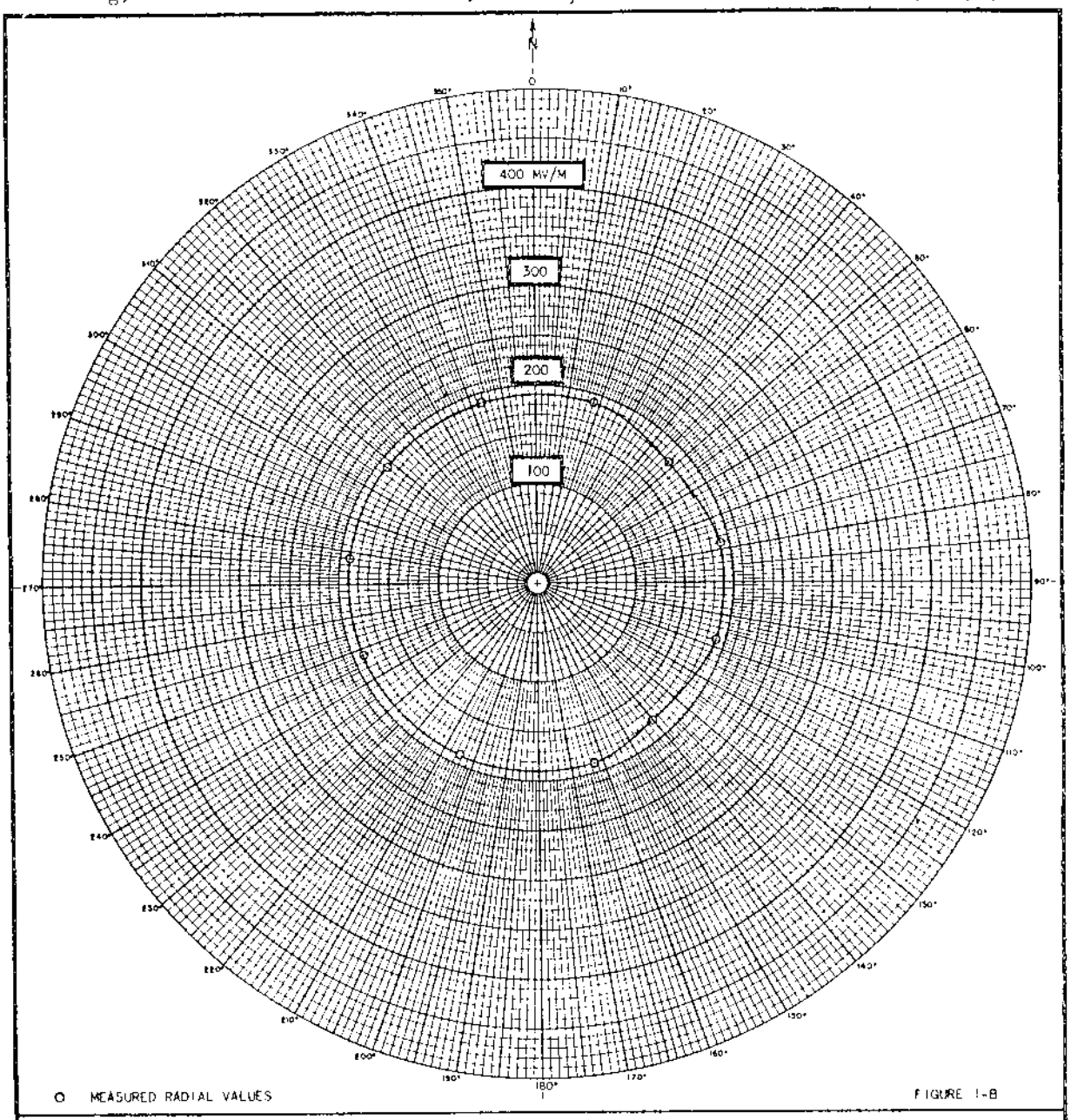
FCC File No. BL-7282
Accepted 11-18-58

WHYL
Carlisle, Pennsylvania

960 KC

WHYL

MEASURED NON-DA (12-12-58g) | Station WHYL Carlisle, Pennsylvania | 5kw, DA-D, D 960 KC



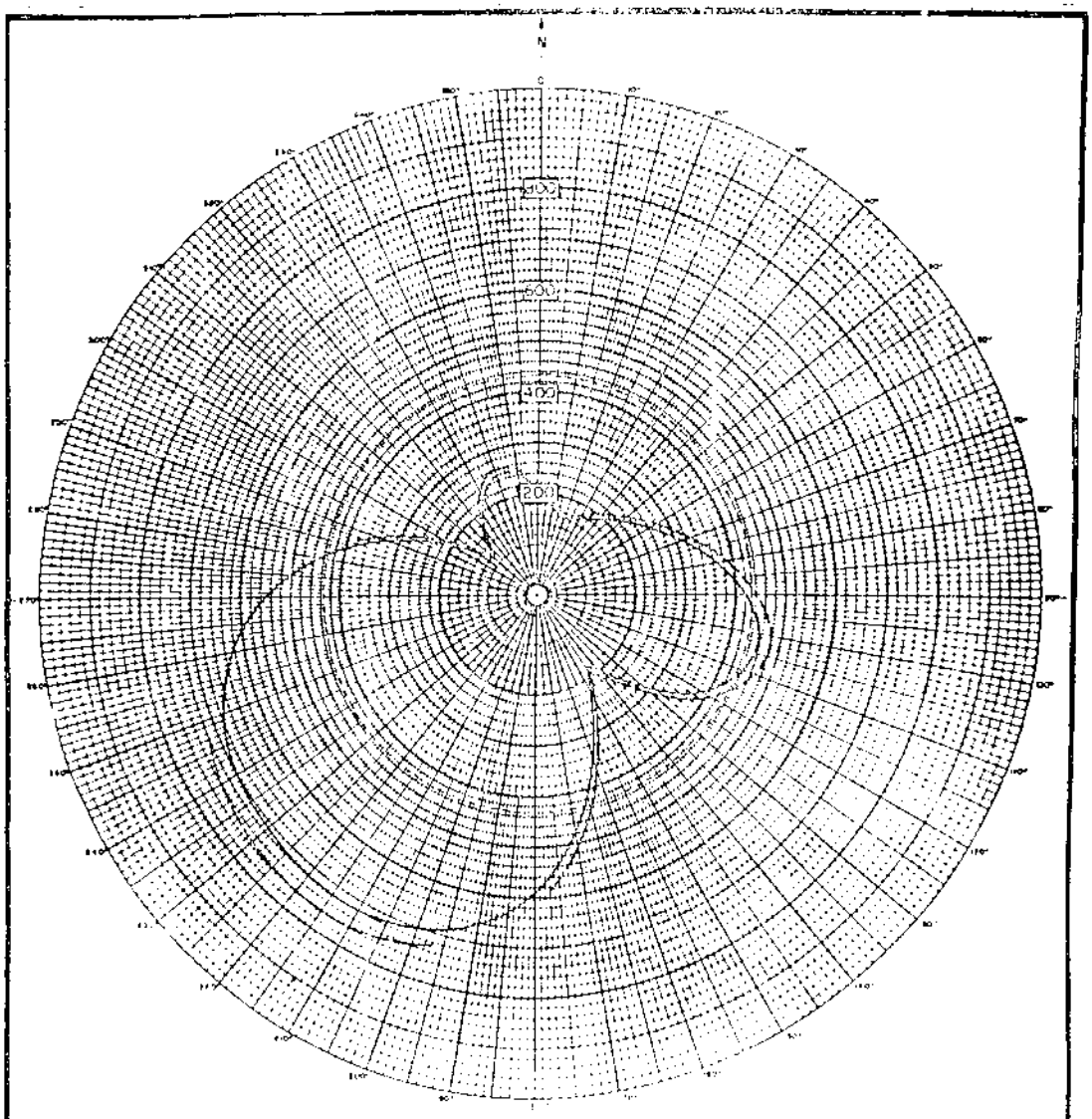
HORIZONTAL RADIATION PATTERN

NON - DIRECTIONAL SURVEY

APPLICANT : RICHARD FIELD LEWIS, JR., INC.
LOCATION : CARLISLE, PENNSYLVANIA (WHYL)
FREQUENCY : 960 KC/S
POWER : 1 KW.
LATITUDE 40 DEG 11 MIN. 34 SEC
LONGITUDE 77 DEG 10 MIN 28 SEC
WHEN USED: NON-DIRECTIONAL SURVEY ONLY
R.M.S. FIELD. 168 MV/M
DATE : OCTOBER 1958

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7282 Accepted 11-18-58 | WHYL Carlisle, Pennsylvania | 960 KC



E_{RMS} = 433.12 MV/M BY ADJUSTMENT

------ MEOV

LATITUDE 31° 37' 05.9"

LONGITUDE 84° 10' 33"

JOHN H. MULLANEY
Consulting Radio Engineers
Washington, D.C.

ANTENNA PARAMETERS

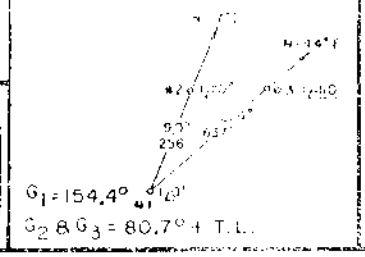


FIGURE 3

PROPOSED DAYTIME
HORIZONTAL POLAR PATTERN

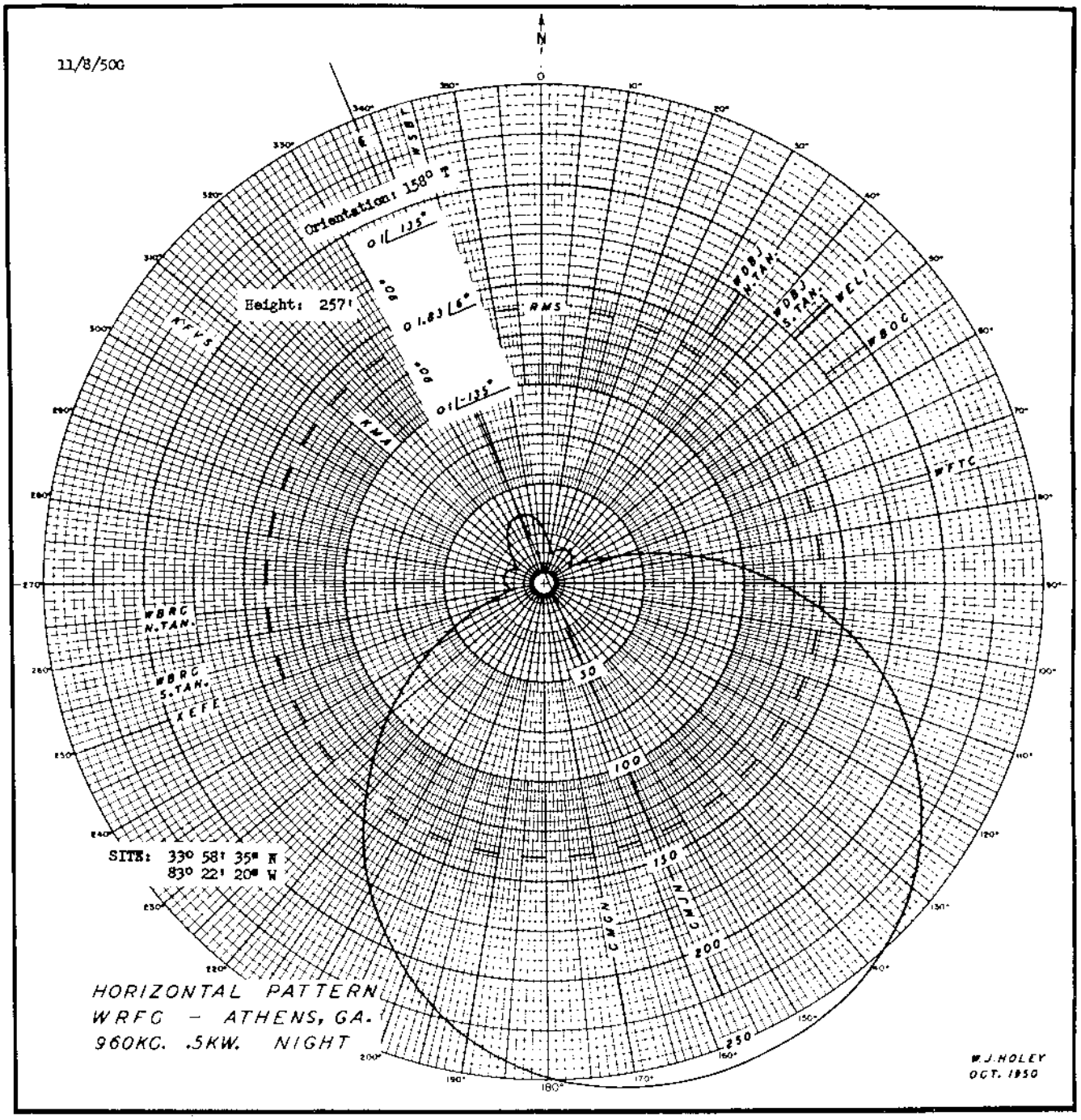
RADIO STATION WJAZ
ALBANY, GEORGIA

960 KC 5 KW-DA-D

granted license 5/10/5 1/20 increase daytime (N-D) power to 5KW.

WRFC

PROPOSED NIGHT | WRFC, ATHENS, GA. | 500w, 1kw-LS, DA-N | 960 kc



AMENDMENT RECD 10/25/50 ACC 11/3/50 BP-7415

WRFC, Athens, Ga. 960 kc

granted license 5/10/57 to increase daytime (N-D) power to 5 KW.

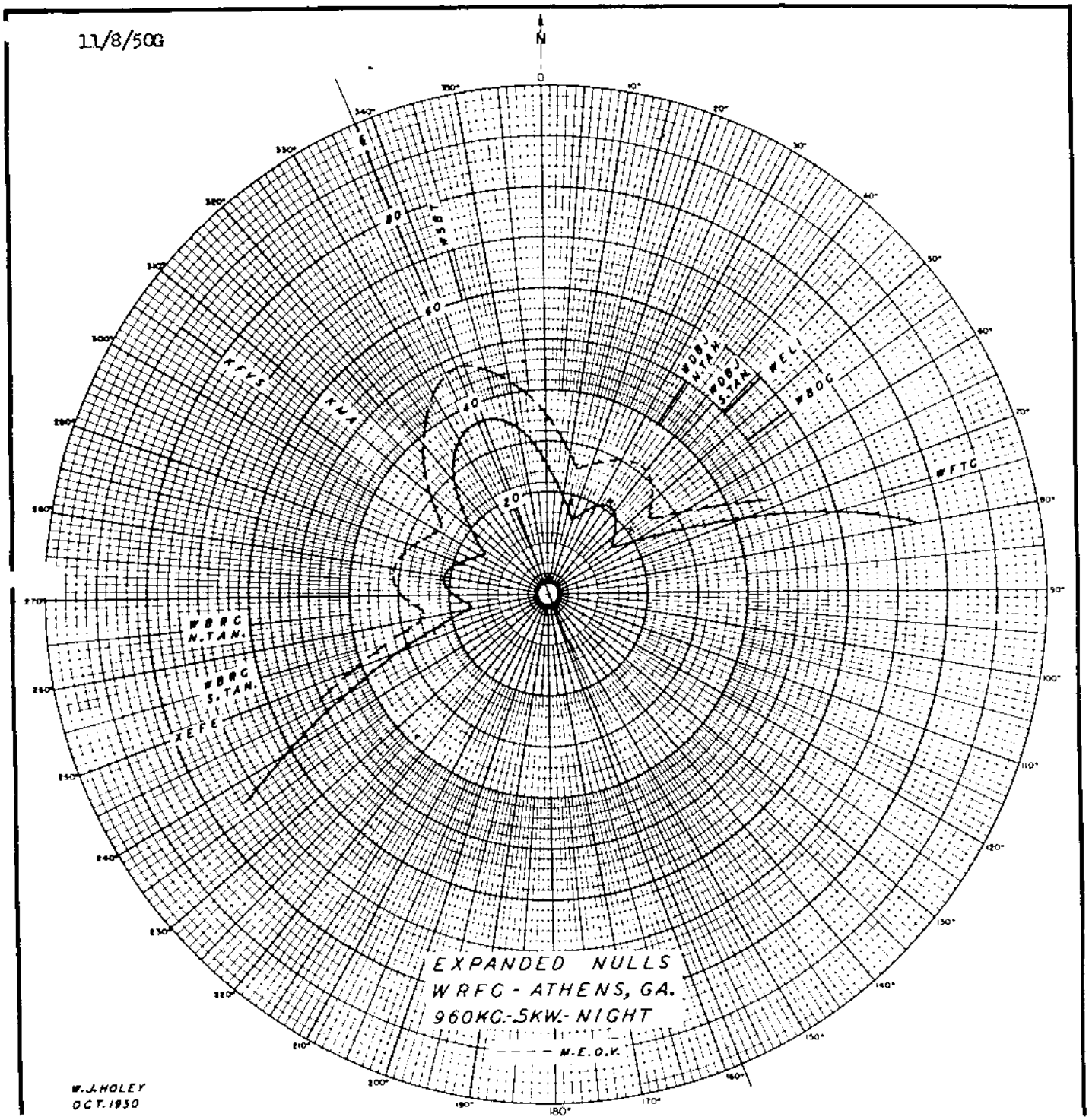
WRFC

PROPOSED NIGHT NULLS

WRFC, ATHENS, GA.

500w, 1kw-LS, DA-N

960 kc



AMENDMENT RECD 10/25/50 ACC 11/3/50 BP-7415

WRFC, Athens, Ga. 960 kc

granted licence 5/10/57 to increase daytime (N-D) power to 5 KW

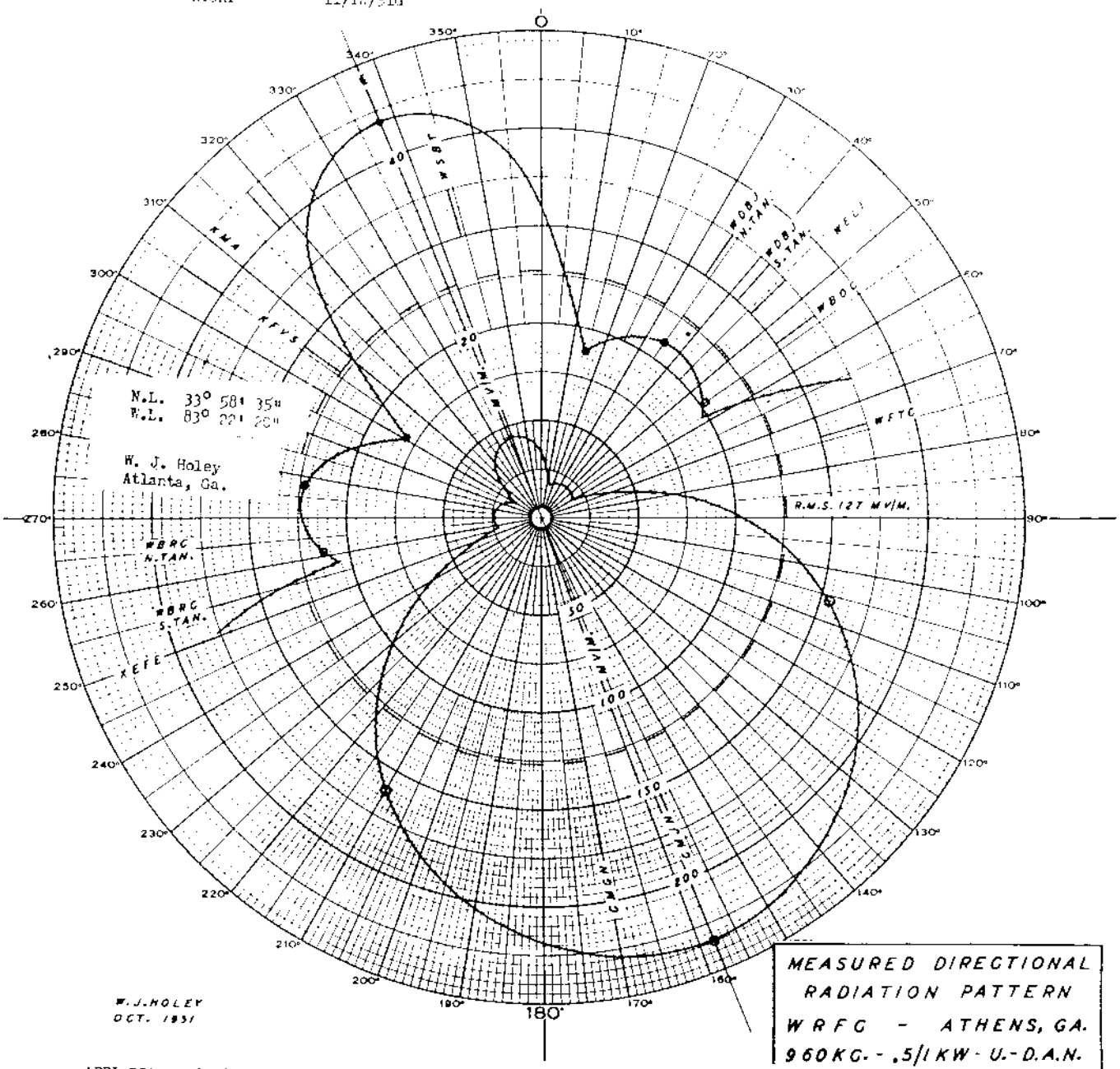
WRFC

MEASURED NIGHT

WRFC, ATHENS, GA. 12/11/51G

5000, 1 [illegible], U, DA-[illegible]

960 KC



W.J.HOLEY
OCT. 1951

MEASURED DIRECTIONAL RADIATION PATTERN
WRFC - ATHENS, GA.
960KC. - .5/1KW - U.-D.A.N.

APPL REED 11/19/51 BL-4574

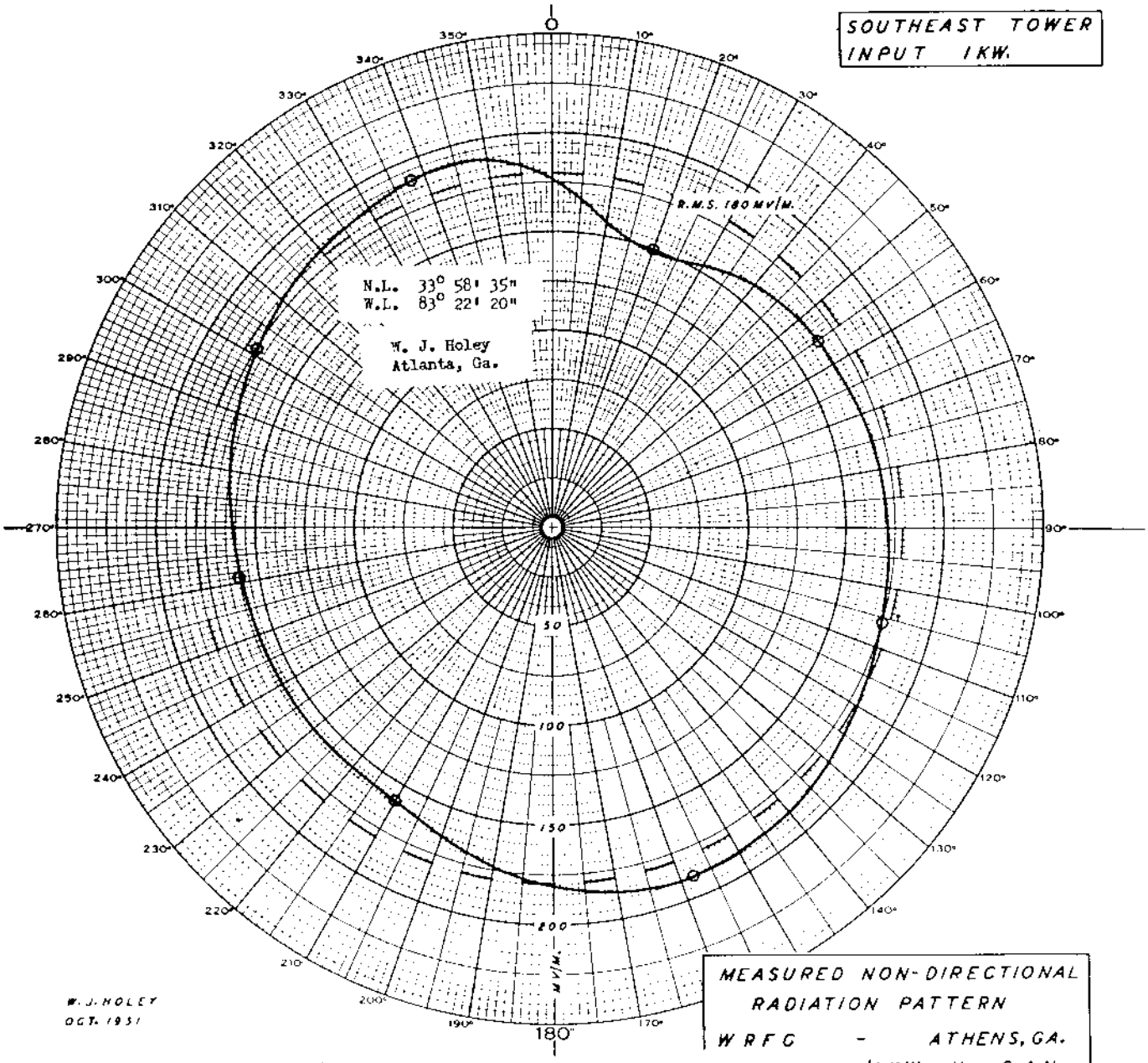
WRFC, ATHENS, GA.

960 KC

granted license 5/10/57 to increase daytime (N-D power to 5KW.

WRFC

MEASURED NON-DA | WRFC, ATHENS, GA. 11/14/51G | 500W, 1 KW-LS, U, DA-N | 960 KC



MEASURED NON-DIRECTIONAL RADIATION PATTERN
WRFC - ATHENS, GA.
11 KW. - U. - D.A.N.

APPL RECD 11/19/51 BL-4574 | WRFC, ATHENS, GA. | 960 KC

WSBT

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station	: WSBT	Main Studio:	South Bend, Indiana
Frequency	: 960 KHz	Power	: 5 kW Night 5 kW Day
Notification	: 1780	Date	: Sept. 28, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude:	41	37	00
West Longitude:	86	13	01

Note: Please retain the description sheet and directional antenna radiation patterns notified for station WSBT in United States Change List Number 363, dated June 1, 1946 and attach to this supplemental Description Sheet. This notification is for the purpose of indicating only correction in the geographical coordinates of the center of the antenna system.

Figure 1
Description of Antenna System
WSBT South Bend, Indiana
960 Kc 5 Kw DA-2 U
October 1962

A. Number of elements:
Daytime: Four towers (#1, 2, 3 & 5)
Nighttime: Four towers (#1, 2, 3 & 4)

B. Type of elements:
Self-supporting, tapered, insulated, series fed vertical radiators

C. Top loading:
None

D. Overall height above insulator:
Towers #1, 2, 3, & 4 = 265 feet
Tower #5 = 429 feet 7 inches

E. Overall height above ground:
Towers #1, 2, 3, & 4 = 273 feet
Tower #5 = 434 feet 7 inches

F. Overall height above mean sea level:
Towers #1, 2, 3, & 4 = 1146 feet
Tower #5 = 1304 feet 7 inches

G. Orientation and spacing:
Towers #1, 2, 3 and 4 spaced at 265 feet (93°) intervals along a bearing of N 352° E. Tower #5 is spaced 586 feet (205.87°) along a bearing of N 75.5° E from the south center tower #2.

H. Ground system:
120 equally spaced radials of #10 copper wire eminating from the base of each of the towers #1, 2, 3 and 4 outward to a distance of 425 feet (150°) or to the edge of the property. The radials were bonded to copper strapping where the radials intersected between towers. Tower #5 ground system consists of 120 equally spaced radials of #10 copper wire extended to 265 feet (93°) or to the edge of the property. The radials were bonded to the ground system of towers #1, 2, 3 and 4 at the points of intersection by the use of copper strapping. In addition, 48 feet square copper ground screen at the base of each tower bonded to the copper radials. #10 copper wire spaced at 20 degree intervals and extending outward 50 feet from the base of the new 1047.55 feet TV-FM tower.

WSBT

Measured Day
(8-23-63ct)

Station WSBT
South Bend, Indiana

5kw,DA-2,U
960 kc

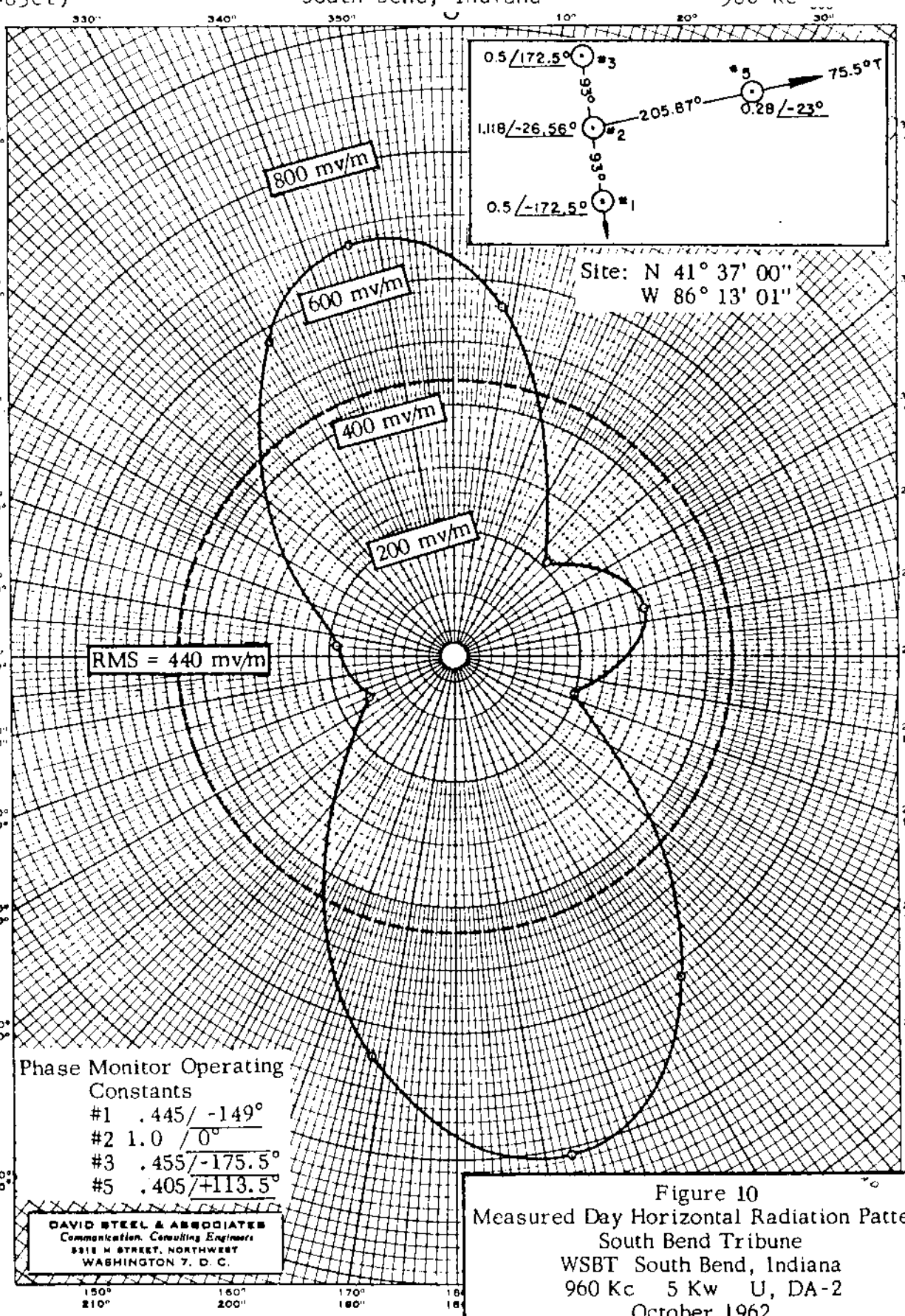


Figure 10
Measured Day Horizontal Radiation Pattern
South Bend Tribune
WSBT South Bend, Indiana
960 Kc 5 Kw U, DA-2
October 1962

FCC File No.BL-9871
Accepted 8-1-63

Station WSBT
South Bend, Indiana

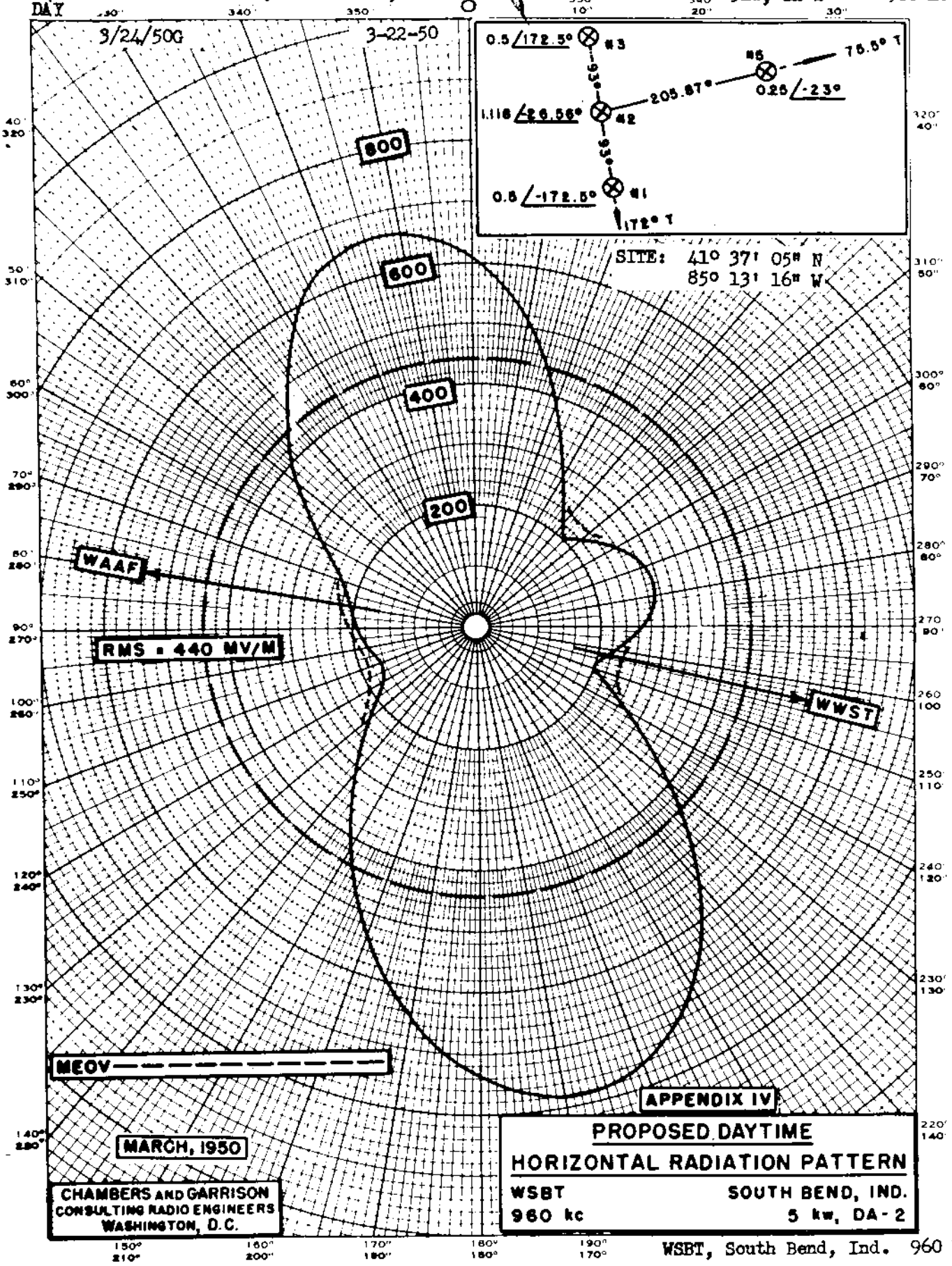
960 kc

WSBT

PROPOSED DAY

WSBT, SOUTH BEND, IND.

5kw, DA-2 960 kc



WSBT, South Bend, Ind. 960 kc

WSBT

Measured Night
(8-23-63ct)

Station WSBT
South Bend, Indiana

5kw,DA-2,U
960 kc

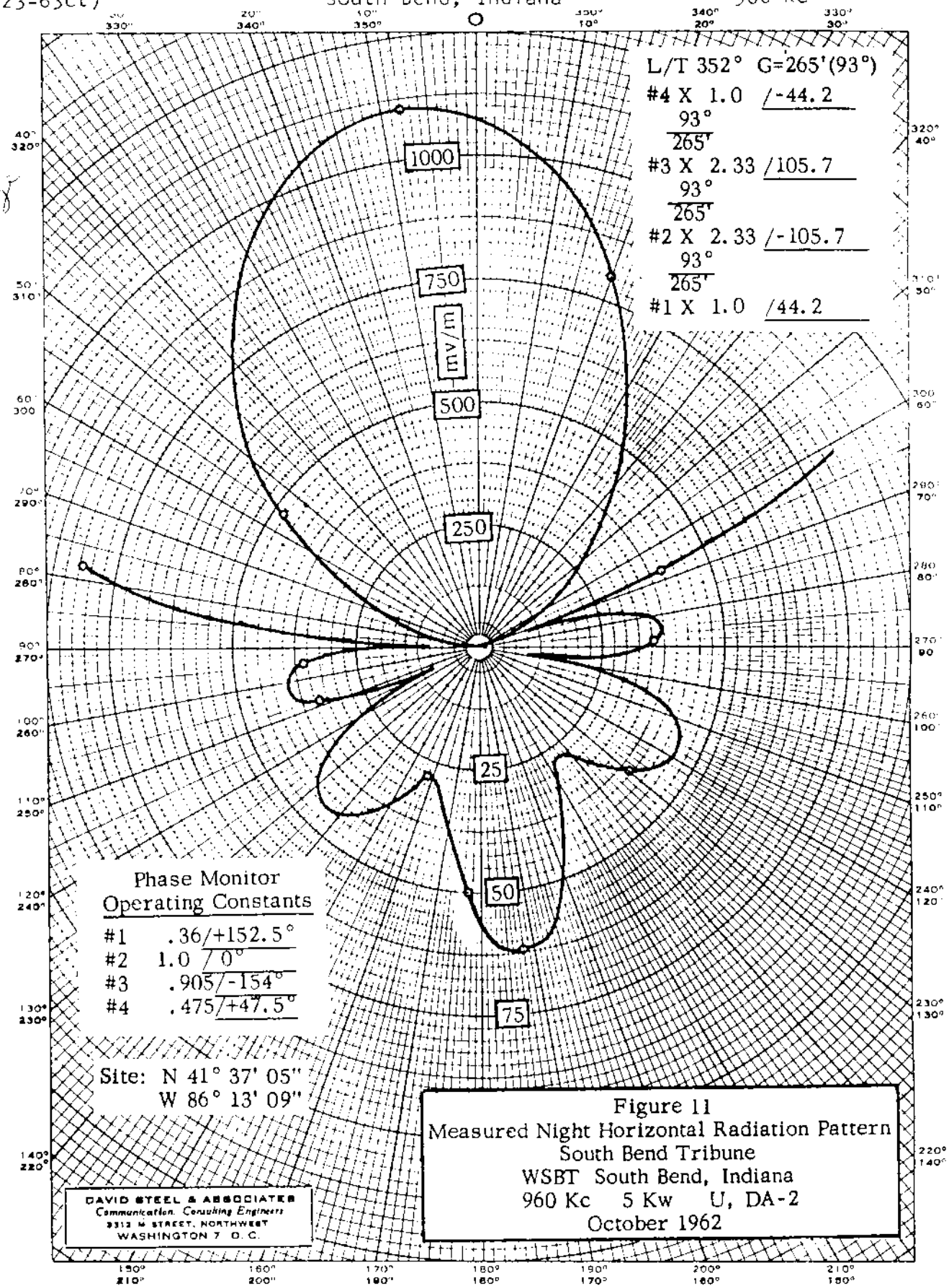


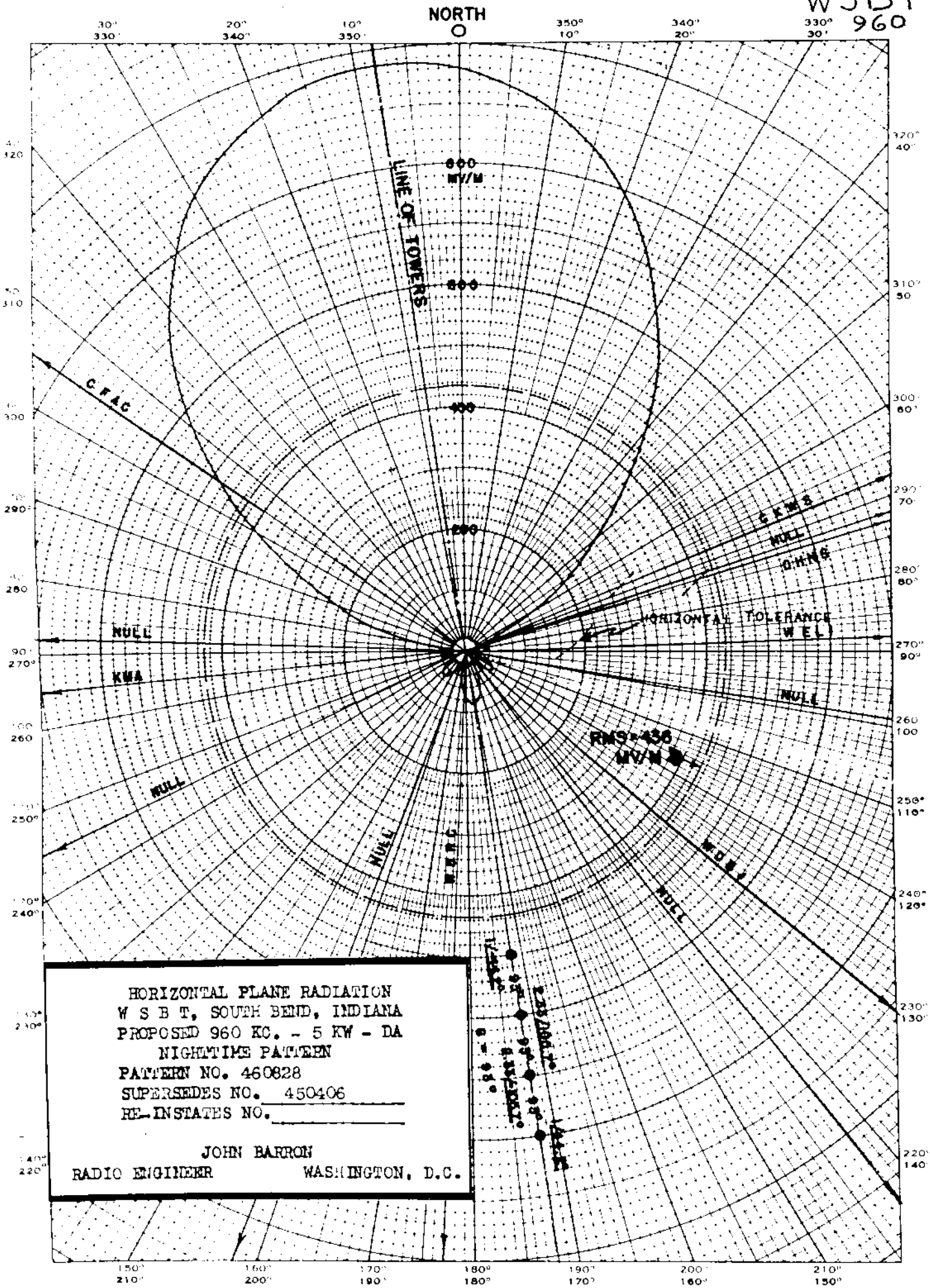
Figure 11
Measured Night Horizontal Radiation Pattern
South Bend Tribune
WSBT South Bend, Indiana
960 Kc 5 Kw U, DA-2
October 1962

FCC File No.BL-9871
Accepted 8-1-63

Station WSBT
South Bend, Indiana

960 kc

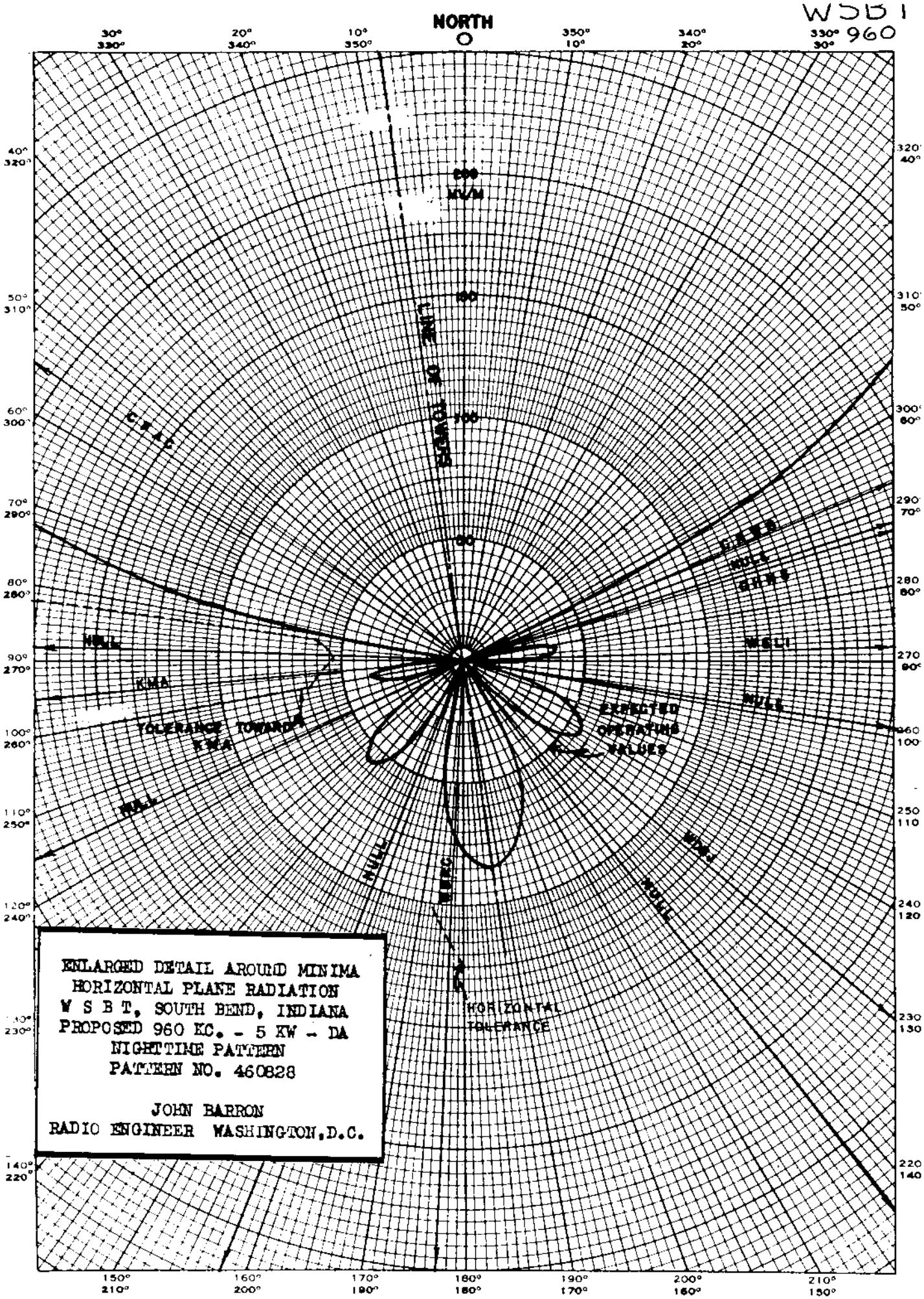
WSBT 960



HORIZONTAL PLANE RADIATION
W S B T, SOUTH BEND, INDIANA
PROPOSED 960 KC. - 5 KW - DA
NIGHTTIME PATTERN
PATTERN NO. 460828
SUPERSEDES NO. 450406
RE-INSTATES NO. _____

JOHN BARRON
RADIO ENGINEER WASHINGTON, D.C.

WSBT 960



ENLARGED DETAIL AROUND MINIMA
HORIZONTAL PLANE RADIATION
W S B T, SOUTH BEND, INDIANA
PROPOSED 960 KC. - 5 KW - DA
NIGHTTIME PATTERN
PATTERN NO. 460828

JOHN BARRON
RADIO ENGINEER WASHINGTON, D.C.

WTCH

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WTCH | Main Studio: Shawano, Wisconsin

Frequency: 960 kHz | Power: 1 kW

Notification List No. 1599 | Date: September 25, 1974 | Class: II

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 44° 46' 47"
West Longitude: 88° 37' 53"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 2
Type of elements: Series-excited, vertical steel towers. Tower #2 is Self-supporting, tapered. Towe #1 is uniform cross-section, guyed.

TOWER:	S(#1)	N(#2)	
HEIGHT ABOVE INSULATORS:	241.5'	241.5'	(84.8°)
PHASING:	0°	-132.3°	
FIELD RATIO:	1	0.910	

SPACING AND ORIENTATION: Elements are spaced 199'(70°) on a line bearing 11° true.

GROUND SYSTEM: 120-240' to 256' equally spaced copper radials plus a ground screen about each tower. Radials are shortened and bonded to a transverse strap along intersections betwee towers.

Predicted effective Night Field: 195 mv/m at rated power.

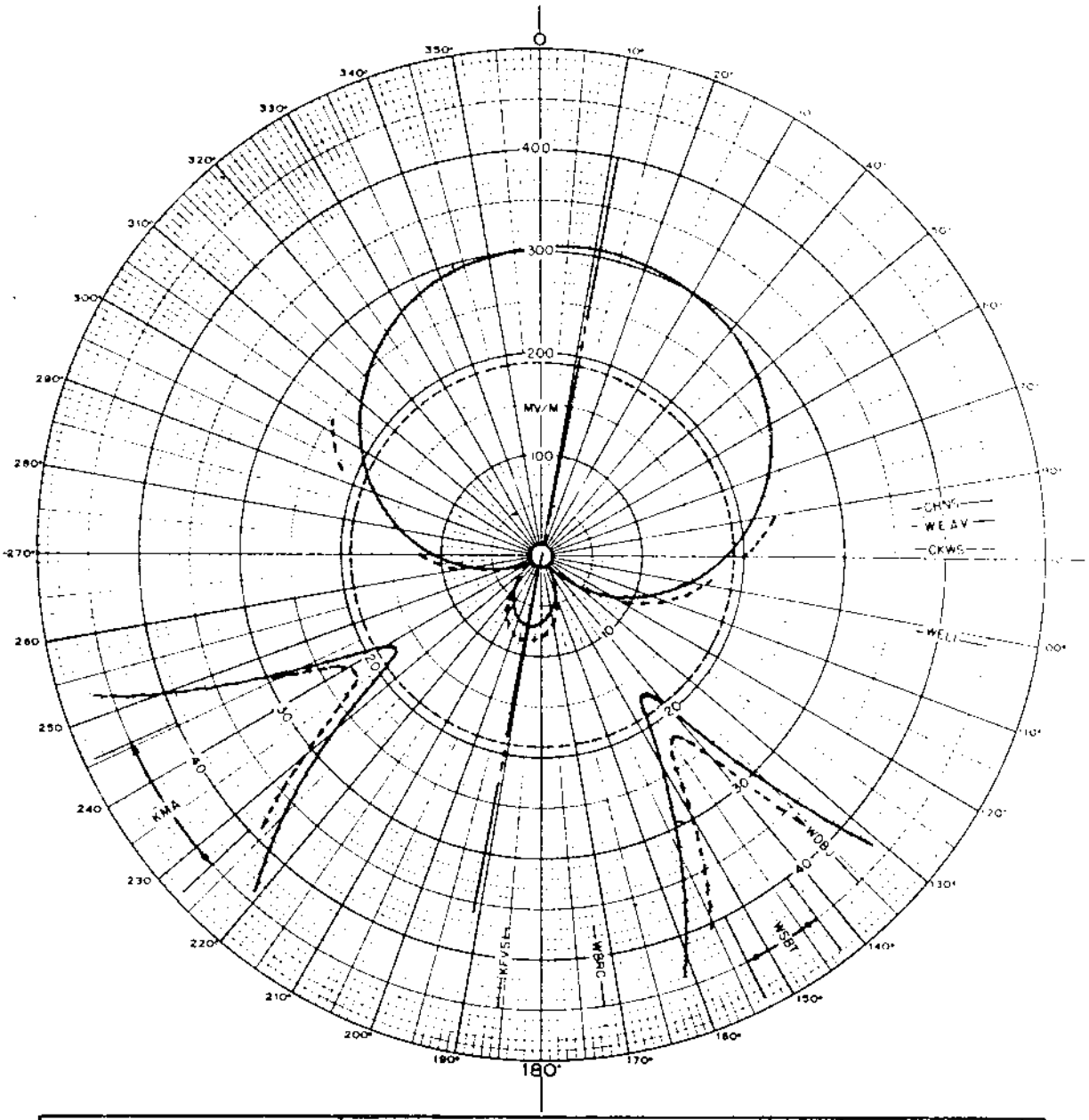
Predicted effective Day Field: (omnidirectional) 188 mv/m at rated power.

Note: Please retain the Nighttime vertical angle directional antenna radiation patterns notified for Station WTCH in United States Change List Number 426 dated October 18, 1951, and attach to this Revised Description Sheet and Nighttime Horizontal pattern. This notification concerns a change to add meovs of radiation to the nighttime pattern with Daytime operation continued as previously notified.

CTR NO 30812A4

WTCH

PROPOSED NIGHT 7/31/51G — WTCH, SHAWANO, WIS. — 1 KW, U, DA-N — 960 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA
	TOWER No	ELECTRICAL HEIGHT °	TRUE TOWER ORIENTATION °	SPACING °	PHASING °	HORIZONTAL FIELD mv/m	FIELD RATIO	ELEV ANGLE °	ELEVATION RMS FIELD mv/m	CALL WTCH
	1	84.8			0	17.32	.0	0	190	FREQUENCY 960 kc
	2		N19°E	70	-132.26		.11	10		POWER 1 kw
	3							20		TIME OF OPERATION U
	4							30		TYPE OF OPERATION DA-2
	5							40		DAYTIME TOWERS 2
	6							50		NIGHTTIME TOWERS 2
	7							60		No RADIALS PER TOWER 120
	8							70		LENGTH OF RADIALS 90 + 256 ft
	9							80		GROUND SCREEN DIMENSION 40 x 40
	10									LAT N 44 46 47
										LONG W 88 37 53
										SUPERSEDES
	DAYTIME OPERATION ☐			NIGHTTIME OPERATION ☒						PATTERN No 49103N

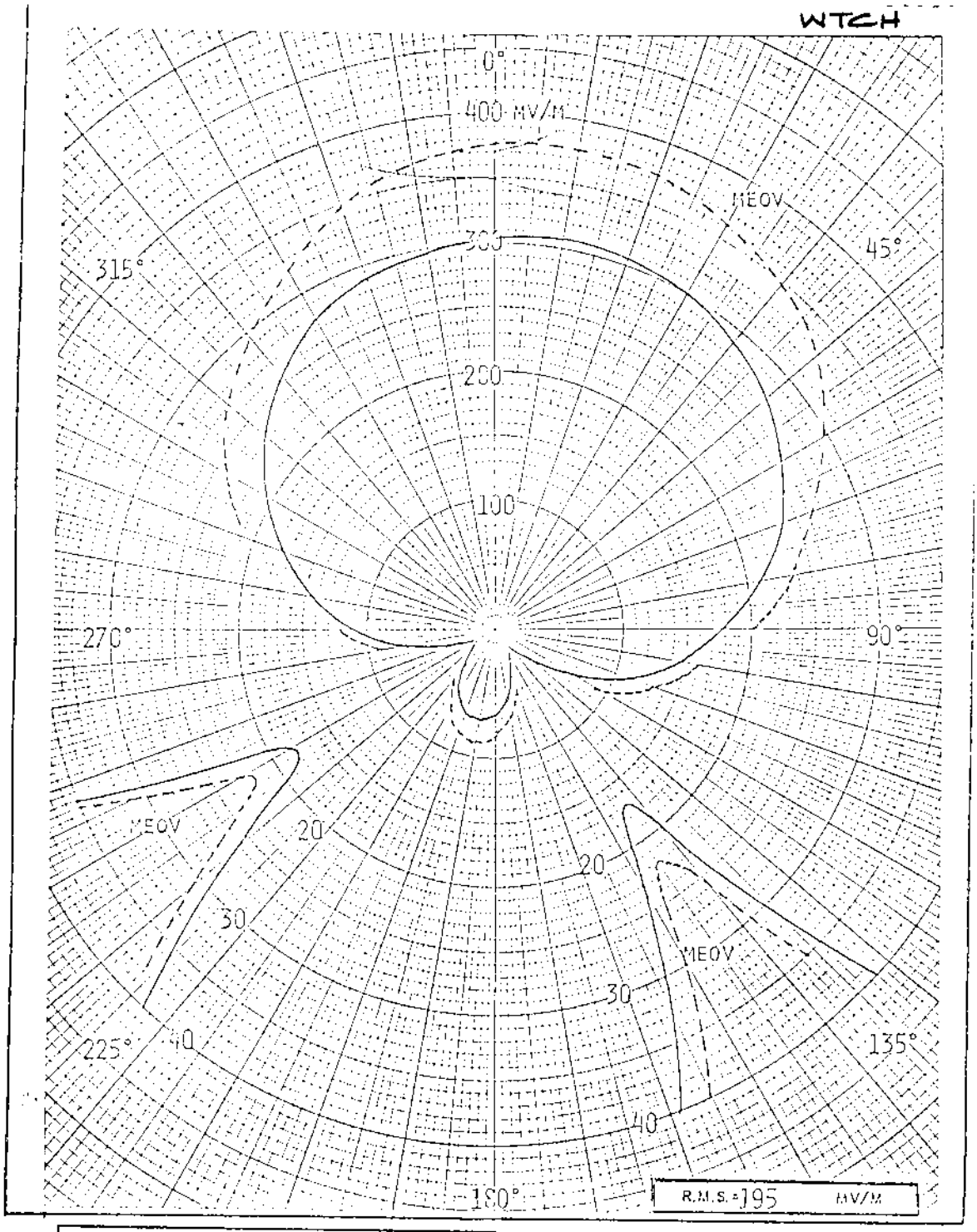
SHAWANO COUNTY LEADER PUB. CO.
Shawano, Wis.

Fig. 1AA 8/19/50

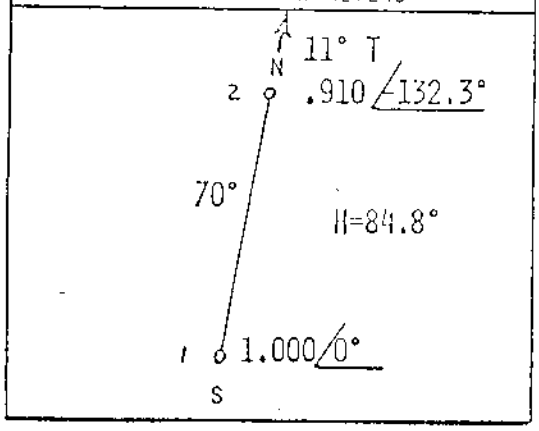
GEORGE P. ADAIR
Radio Engineering Consultants
WASHINGTON, D. C.

AMENDMENT RECD 6/13/51 BP-7488 — WTCH, SHAWANO, WIS. — 960 KC

WTCH



PATTERN PARAMETERS



DIRECTIONAL RADIATION PATTERN

WTCH

☐ MEASURED ☒ PROPOSED

FREQ: 960 (KHZ) POWER 1.0 (KW) ☐ DA-D

N LAT. 44 ° 46 ' 47 " ☒ DA-N

W LONG 88 ° 37 ' 53 " ☐ N-D

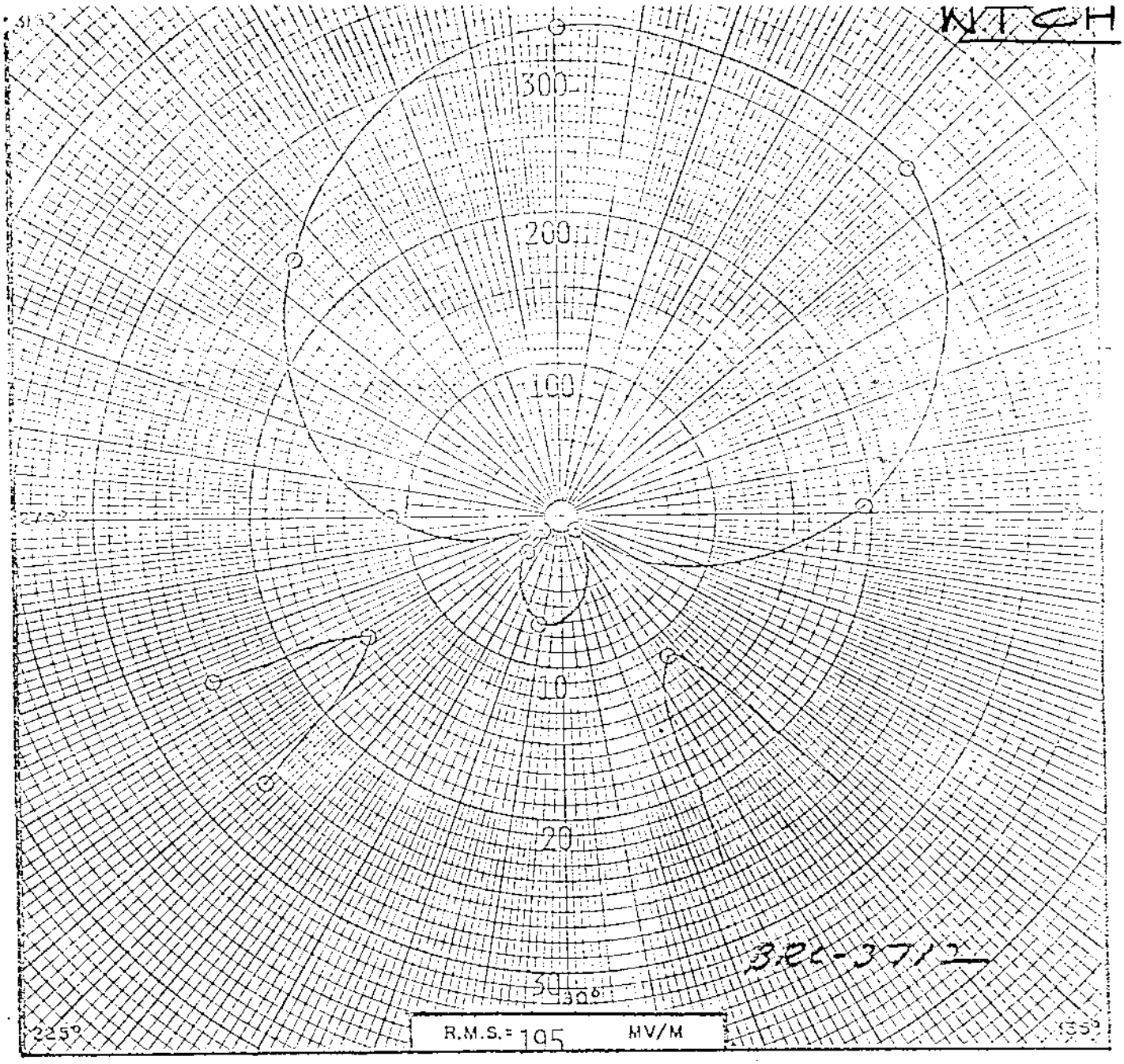
LOCATION: SHAWANO, WISCONSIN

DATE: AUGUST 1974

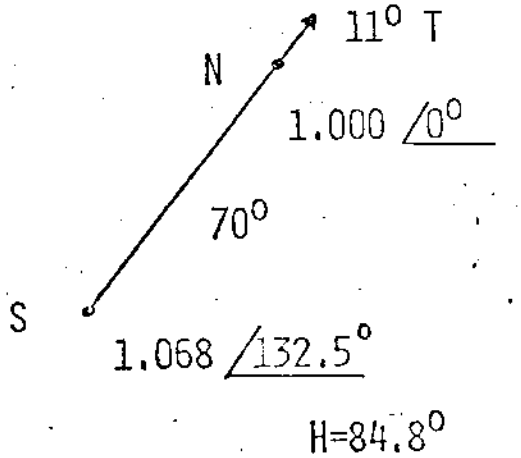
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FIGURE 1

WTCH



PATTERN PARAMETERS



DIRECTIONAL RADIATION PATTERN WTCH

Shawano County Leader Publishing Co.

[X] MEASURED [ ] PROPOSED

FREQ: 960 (KHZ) POWER 1 (KW) [ ] DA-D

N. LAT. 44° 46 ' 47 " [X] DA-N

W. LONG. 88° 37 ' 53 " [ ] N-D

LOCATION: Shawano, Wisconsin

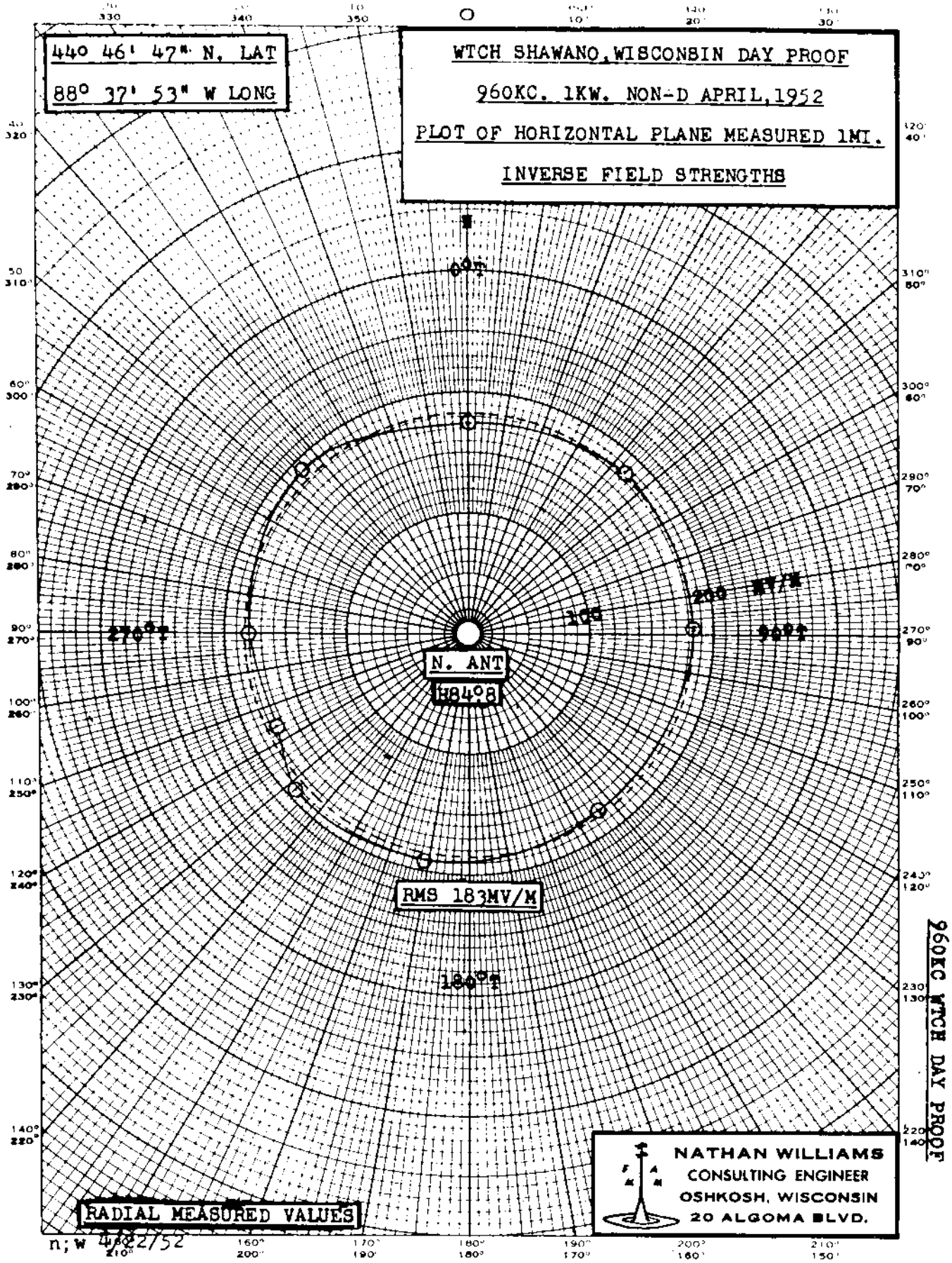
DATE: April, 1974

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FIGURE

WTCH

MEASURED DAY | WTCH, SHAWANO, WIS. 6/11/52G | 1 KW, U, DA-N | 960 KC



n; w 4/22/52

APPL RECD 5/22/52 ACC 6/9/52 BL-4720 | WTCH, SHAWANO, WIS. | 960 KC

Nuevo AD

DESCRIPCION DEL SISTEMA DIRECCIONAL DE RADIACION

ESTACION	X E D F
FRECUENCIA	9 6 0 Khz.
CLASE	III - A
ESTUDIOS EN	Nvo. Laredo, Tamps.
POTENCIA	1000 W-N 5000 Watts-D
LISTA DE CABLOS	182.

(Para llenarse por la Dirección General de Telecomunicaciones.)

FECHA 23-VIII-56.

(Para llenarse por la Dirección General de Telecomunicaciones.)

LOCALIZACION GEOGRAFICA DEL SISTEMA RADIADOR	LONGITUD: 99° 30' 03" LATITUD: 27° 29' 46"
AUTORIZADO PARA OPERACION	AD - 1
NUMERO DE ELEMENTOS RADIADORES	DOS
TIPO DE ELEMENTOS RADIADORES	Torres verticales de acero soportadas con retenidas.
TORRES	Norte / Sur
ALTURA SOBRE LOS AISLADORES	78.07 mts. / 78.07 mts.
SEPARACION ENTRE TORRES	45° = 39.03 mts
MAGNITUDES RELATIVAS DE CORRIENTES.	1 / 1
DEFASAMIENTO	80° / 0°
AZIMUT DEL EJE DE LAS TORRES	169°
RAIZ CUADRATICA MEDIA TEORICA	391.3 mv./m.
INTENSIDAD DE CAMPO R.C.M. NO ATENUADO A UN KILOMETRO POR KILOWATT DE POTENCIA RADIADA	175 mv./m.

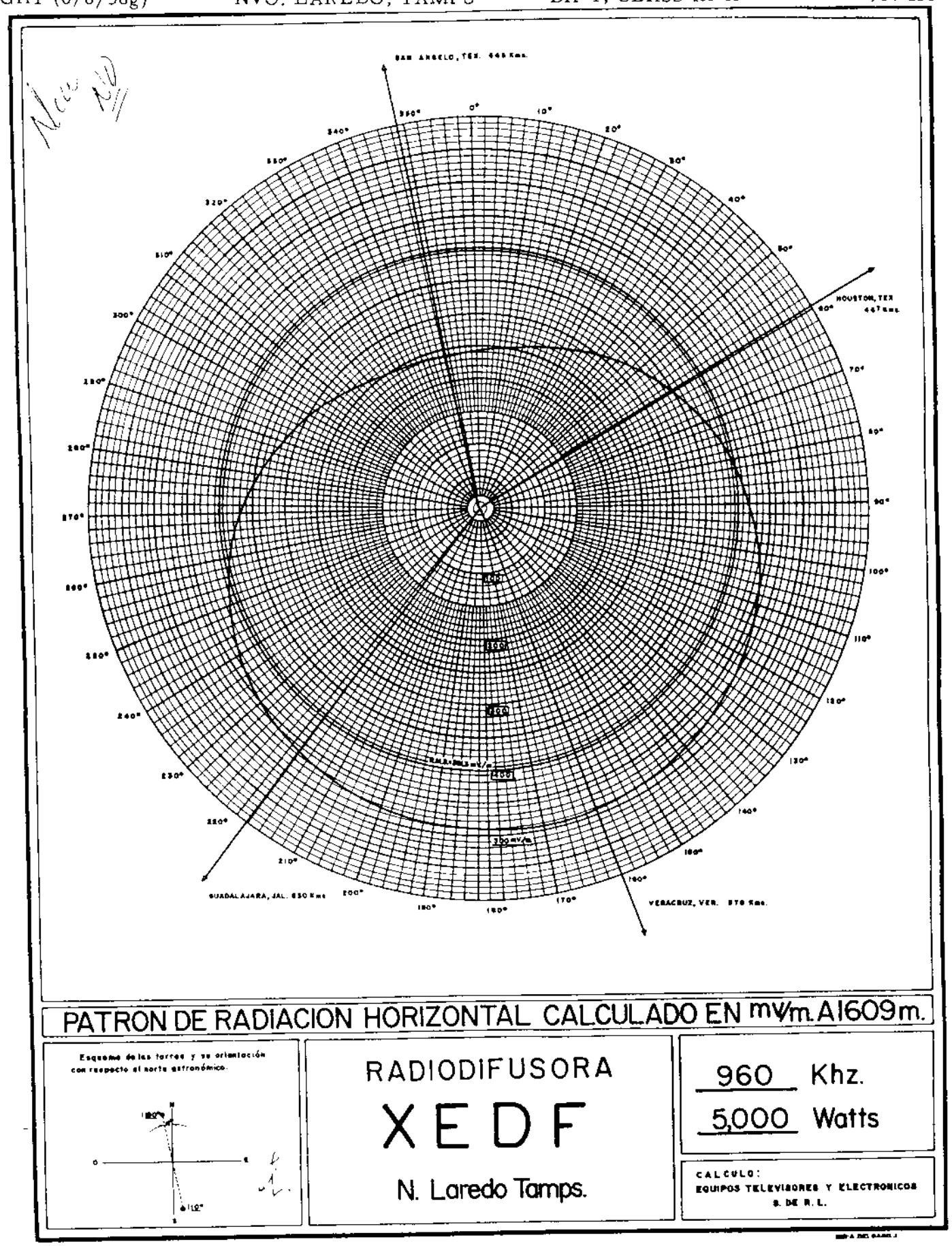
Indíquese si la operación es diurna, nocturna o diurna-nocturna.

REVISO: Julio L. Luna

APROBO:

XEDF

PROPOSED DAY & NIGHT (6/6/56g) | STATION XEDF NVO. LAREDO, TAMPS | 1000 W-N, 5000 W-D DA-1, CLASS III-A | 960 KC



Notification List: 182 Date: August 23, 1955 XEDF, Nvo. Laredo, Tamps. 960 KC

CBZ

SUPPLEMENTAL DIRECTIONAL

ANTENNA DESCRIPTION SHEET

Station: CBZ

Main Studio: Fredericton, N.B.

Frequency: 970 KHz

Power: 10 Kw, Class III

Notification List No: 325

Date: May 17, 1974

Geographical Location of
the Center of the Antenna System:

North Latitude: 45° 55' 34"
West Longitude: 66° 38' 12"

Mode of Operation - DA-N
ND-D-180

Note: Please retain the description sheet and directional antenna radiation patterns notified for station CBZ in Canadian Change List Number 192 dated December 14, 1964 and revised March 8, 1965 and attach to this supplemental description sheet. This notification is for the purpose of indicating only a correction in the geographical coordinates.

CBZ

CORRECTED

DESCRIPTION OF ANTENNA SYSTEM

Station: CBZ Main Studio: Fredericton

Frequency: 970 Kc/s Power: 10 KW Class: III

Geographical Location of Antenna Centre:

Latitude: 45° 55' ~~30"~~ 34" N
Longitude: 66° 38' ~~13"~~ 12" W

Antenna Characteristics:

Day and Night Operation: DA-N Notification List No. 192

No. of Elements: 2 Date: December 14, 1964

Type of Elements: Series fed, uniform cross section guyed, vertical steel towers.

Towers:	1 (S.W.)	2 (N.E.)
Height above insulators:	160 ft. (56.7°)	160 ft. (56.7°)
Night phasing:	0°	-128.8°
Night field ratio:	1.0	1.0
Day phasing:	---	0°
Day field ratio:	---	1.0

Spacing and Orientation: Elements are spaced 165 ft. 3 ins. (58.63°) apart and lie on a line bearing 39° true north.

Ground System: 120 Radials per tower, spaced at 3° and averaging 266 ft. long, except in the area between towers, where the radials are bonded to a common transverse copper strap midway between the towers.

Antenna Efficiency: Day: 570 mv/m for 10 KW
Night: 555 mv/m for 10 KW

NOTE: Please retain antenna radiation patterns notified for CBZ Fredericton, N.B. in Change List No. 192, dated December 14, 1964 and attach to this corrected description sheet. This only concerns a correction in the spacing of the antenna elements.

March 8, 1965.

Transmission & Development Department

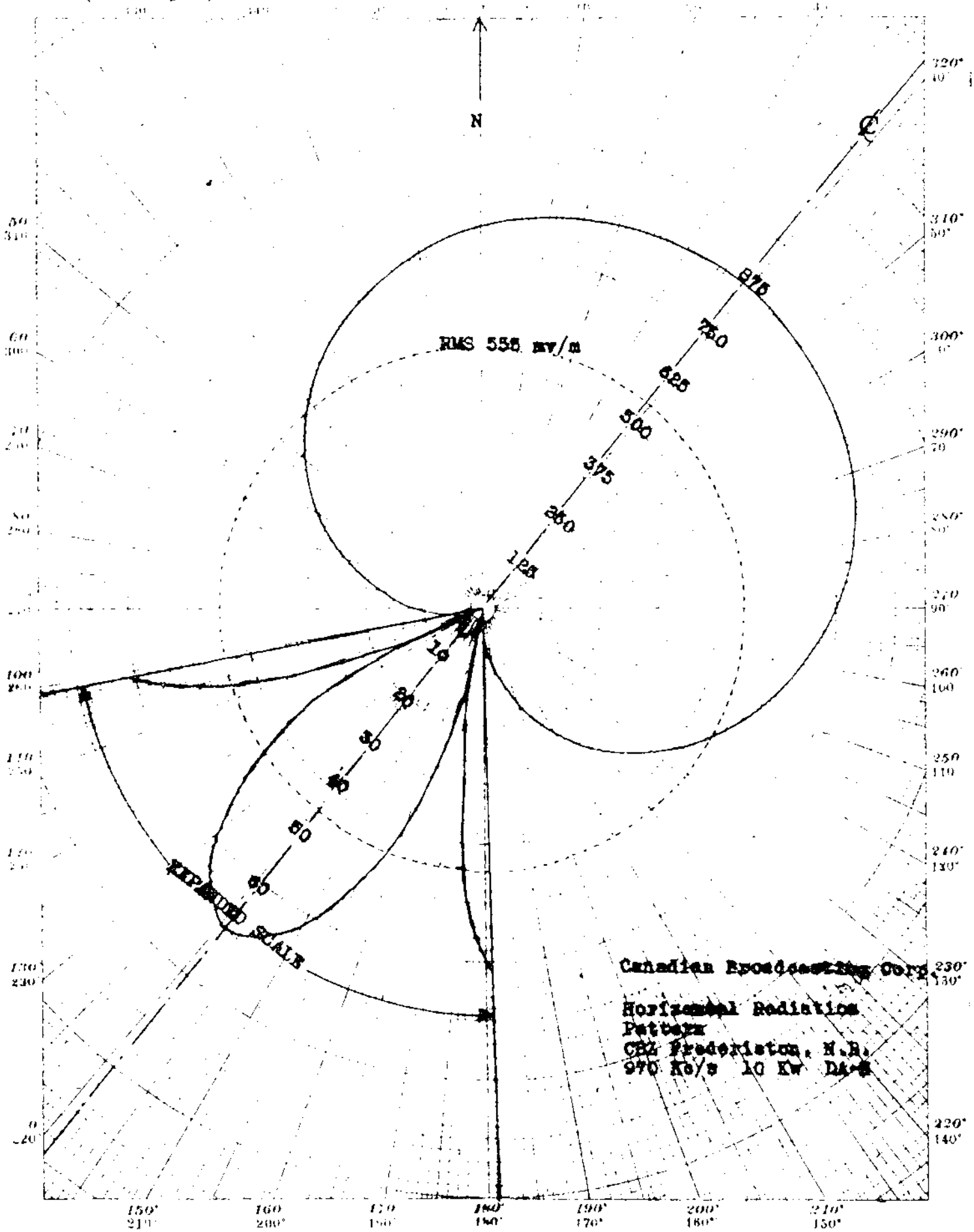
C.B.C.-452A

CBZ

Proposed Night
(1-28-65ct)

Station CBZ
Fredericton, N.B.

10kw,DA-N,U,Class III
970 kc



5-10-59

Directional Antenna Description Sheet

Station: CKCH Main Studio: Hull, Quebec

Frequency: 970 kc/s. Power: 5 Kw. Class: III-A

Modification List No. 89 Date: December 3, 1954

Geographical Location of the Centre of the Antenna System: North Latitude: 45° 23' 59"
West Longitude: 75° 48' 47"

Antenna: Mode of Operation: Directive array for Day and Night operation. DA-1

Elements: Three, guyed, uniform cross-section, insulated from ground, series fed, no top loading.

Tower:	No. 1 (S.)	No. 2 (Centre)	No. 3. (NE)
Height above insulators:	240' (85°)	240'	240'
Spacing:	173' (61.5°) between adjacent towers		
Phasing:	+148.2°	0°	-148.2°
Field ratio:	.549	1	.549

Ground System: 120 radials per mast, approximately .4 wavelength. #10 B. & S. copper wire, buried approximately 8".

Predicted Effective Field: 450 mv/m (201 mv/m at 1 Km.)

Orientation: Line of Towers: 20° East of True North

(P.C. 970 kc. 1 kw. DA-1 U III)

/ 89

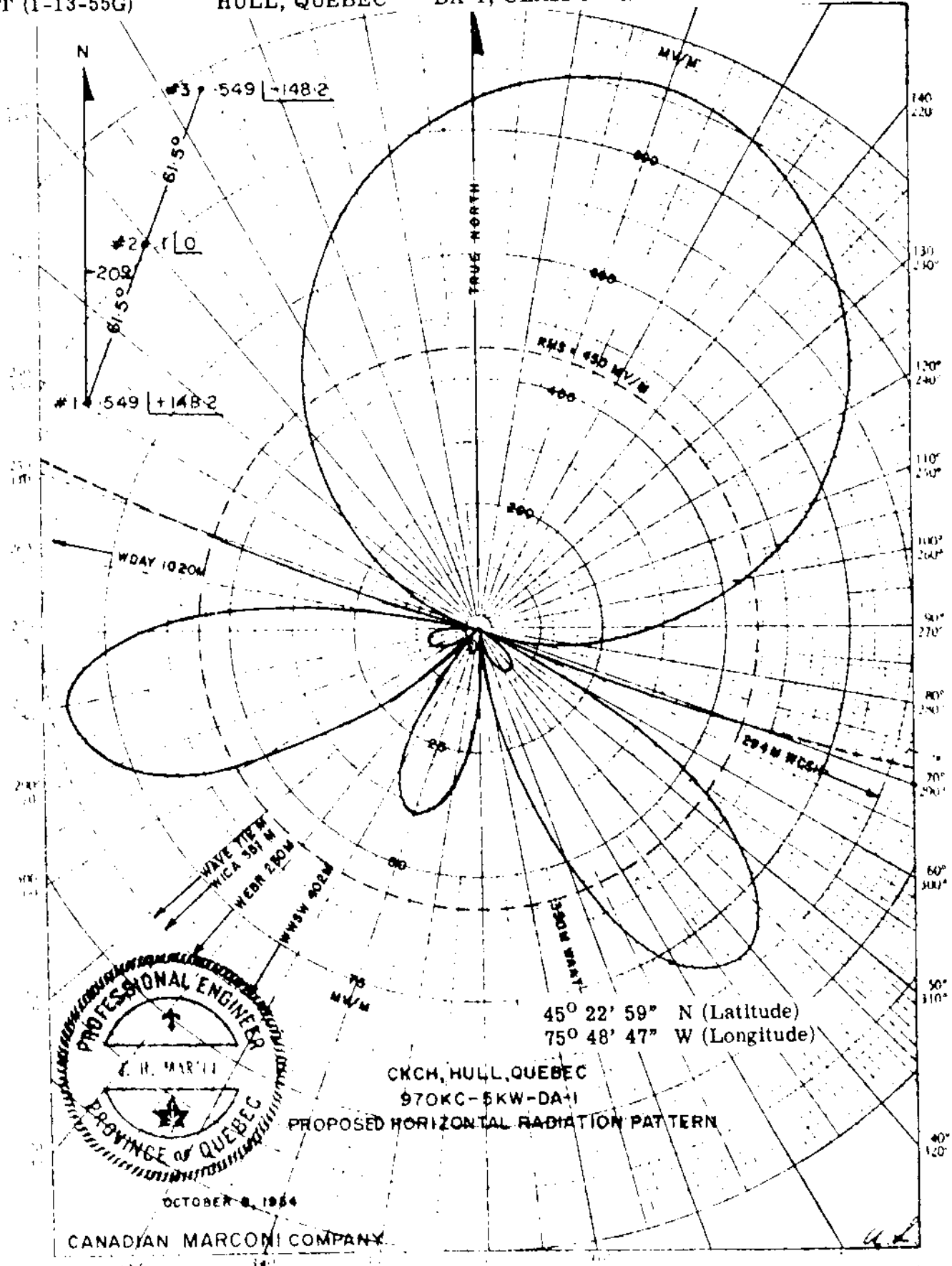
CKCH

PROPOSED DAY
AND NIGHT (1-13-55G)

CKCH
HULL, QUEBEC

5 KW
DA-1, CLASS III-A

970 KC/S



CKCH, HULL, QUEBEC

970 KC/S

CJYR

Description Sheet
(8-28-67ct)

New Station
Edson, Alberta

10kw,DA-1,U,Class III
970 kc

DESCRIPTION SHEET - DIRECTIONAL ANTENNA

Station: NEW

Main Studio: Edson, Alberta

Frequency: 970 kHz

Power: 10 KW

Notification List: 229

Date: July 31, 1967.

GEOGRAPHICAL LOCATION: Latitude: 53° 32' 09" North
Longitude: 116° 36' 06" West

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-1
Number of Elements: Two (2)
Type of Elements: Guyed steel towers, uniform cross section, base insulated for series feed.

TOWER:	#1 SOUTH	#2 NORTH
HEIGHT ABOVE INSULATORS:	200' (71°)	200' (71°)
OVERALL HEIGHT:	205'	205'
FIELD RATIO:	1.0	.92
PHASING:	0°	-124°

GROUND SYSTEM: 120 equally spaced radials per tower of No. 10 B & S gauge bare copper wire, buried approximately 8". Length of radials 406' (0.4 wavelength) with the exception of those joined along the common chord.

SPACING AND ORIENTATION OF TOWERS: Towers are on a line bearing 20° West of True North and are spaced 225.5' (80°) apart.

PREDICTED EFFECTIVE FIELD:

590 mv/m at 1 mile for 10 KW
186 mv/m at 1 mile for 1 KW

D. E. M. ALLEN, P. ENG. BROADCAST CONSULTING ENGINEER

CJYR

Proposed Day & Night
(8-28-67ct)

New Station
Edson, Alberta

10kw,DA-1,U,Class III
970 kc

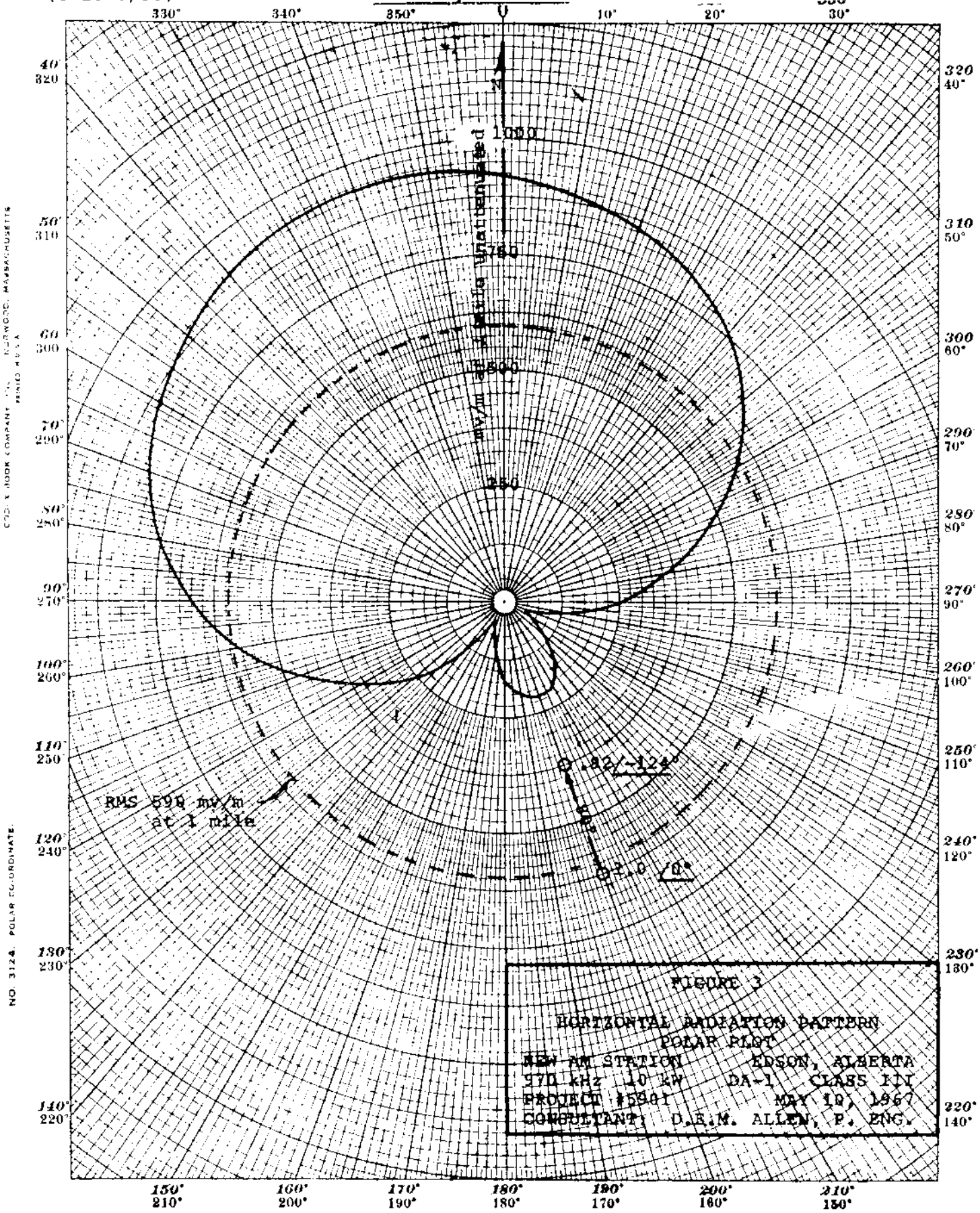


FIGURE 3

HORIZONTAL RADIATION PATTERN
POLAR PLOT
NEW AM STATION EDSON, ALBERTA
970 kHz 10 kW DA-1 CLASS III
PROJECT #5981 MAY 10, 1967
CONSULTANT: D.E.M. ALLEN, P. ENG.

Proposed Day & Night Nulls (8-28-67ct)

New Station Edson, Alberta

10kw,DA-1,U,Class III 970 kc

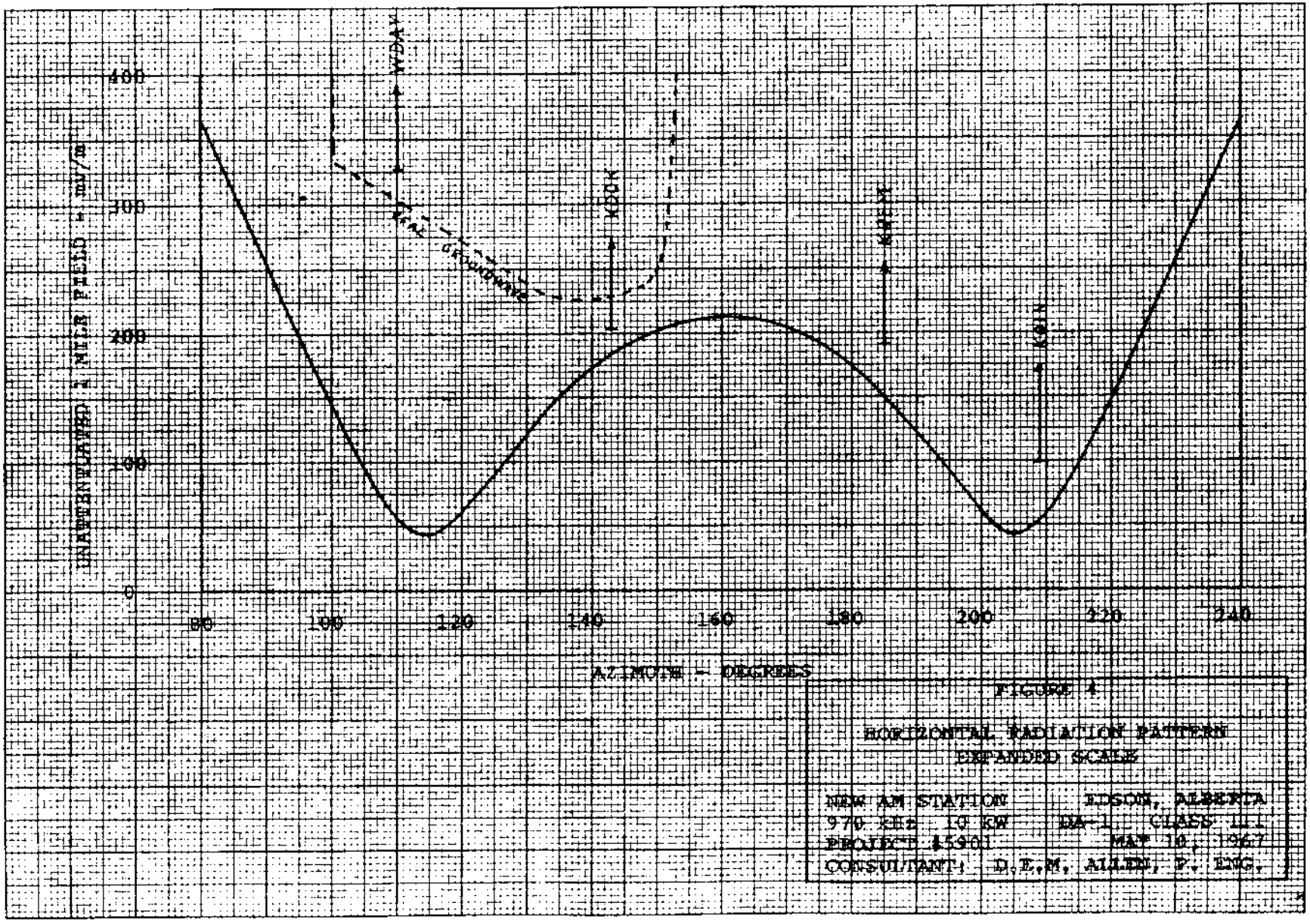


FIGURE 4

HORIZONTAL RADIATION PATTERN
EXPANDED SCALE

NEW AM STATION EDSON, ALBERTA
970 KHz 10 KW DA-1 CLASS III
PROJECT #5901 MAY 10, 1967
CONSULTANT: D.E.M. ALLEN, P. ENG.

CJYR

CKCH
970 kHz

PROJECT #15704

DESCRIPTION SHEET - DIRECTIONAL ANTENNA

STATION: CKCH

MAIN STUDIO: Hull, Quebec

FREQUENCY: 970 kHz

POWER: 10 kW D/5 kW N CLASS: III

NOTIFICATION LIST NO.: 409

DATE: November 30, 1981

GEOGRAPHICAL LOCATION:

Latitude: 45° 22' 59" North
Longitude: 75° 48' 47" West

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-2

Number of Elements: 3 (Three)

Type of Elements: Guyed steel towers, uniform cross-section, base insulated for series feed

TOWER:	#1 (SW)	#2 (C)	#3 (NE)
Height above Base Insulator:	240' (85°)	240' (85°)	240' (85°)
Overall Height:	243'	243'	243'
Field Ratio:			
Nighttime	.549	1.0	.549
Daytime	.566	1.0	.494
Phasing:			
Nighttime	148.2°	0°	-148.2°
Daytime	140.5°	0°	-141.2°
Orientation:	Ref.	20°	20°
Spacing:	Ref.	173' (61.5°)	346' (123°)

GROUND SYSTEM:

120 radials of #10 Bare Soft Copper wire extend from the base of each tower for a distance of 406' (0.4 wavelength) with the exception of those joined along the common chords and those extending to the edge of the property. In addition, 120 radials, 50 ft. long, extend from the base of each tower.

PREDICTED EFFECTIVE FIELD:

Nighttime: 450 mV/m at 1 mile for 5 kW
201 mV/m at 1 mile for 1 kW

Daytime: 637 mV/m at 1 mile for 10 kW
201 mV/m at 1 mile for 1 kW

January 18, 1978
Revised March 17, 1981

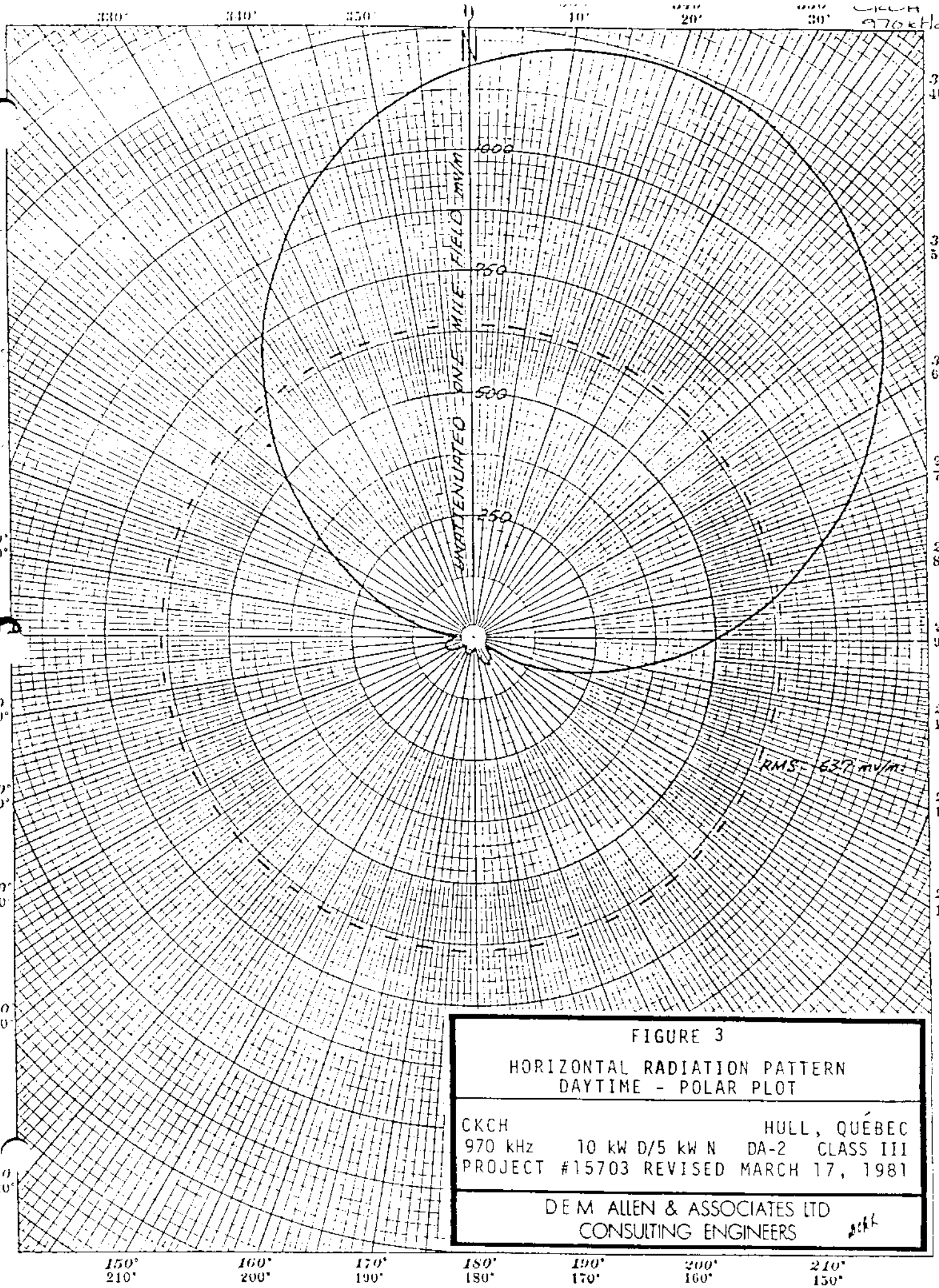


FIGURE 3

HORIZONTAL RADIATION PATTERN
DAYTIME - POLAR PLOT

CKCH HULL, QUÉBEC
970 kHz 10 kW D/5 kW N DA-2 CLASS III
PROJECT #15703 REVISED MARCH 17, 1981

D E M ALLEN & ASSOCIATES LTD
CONSULTING ENGINEERS

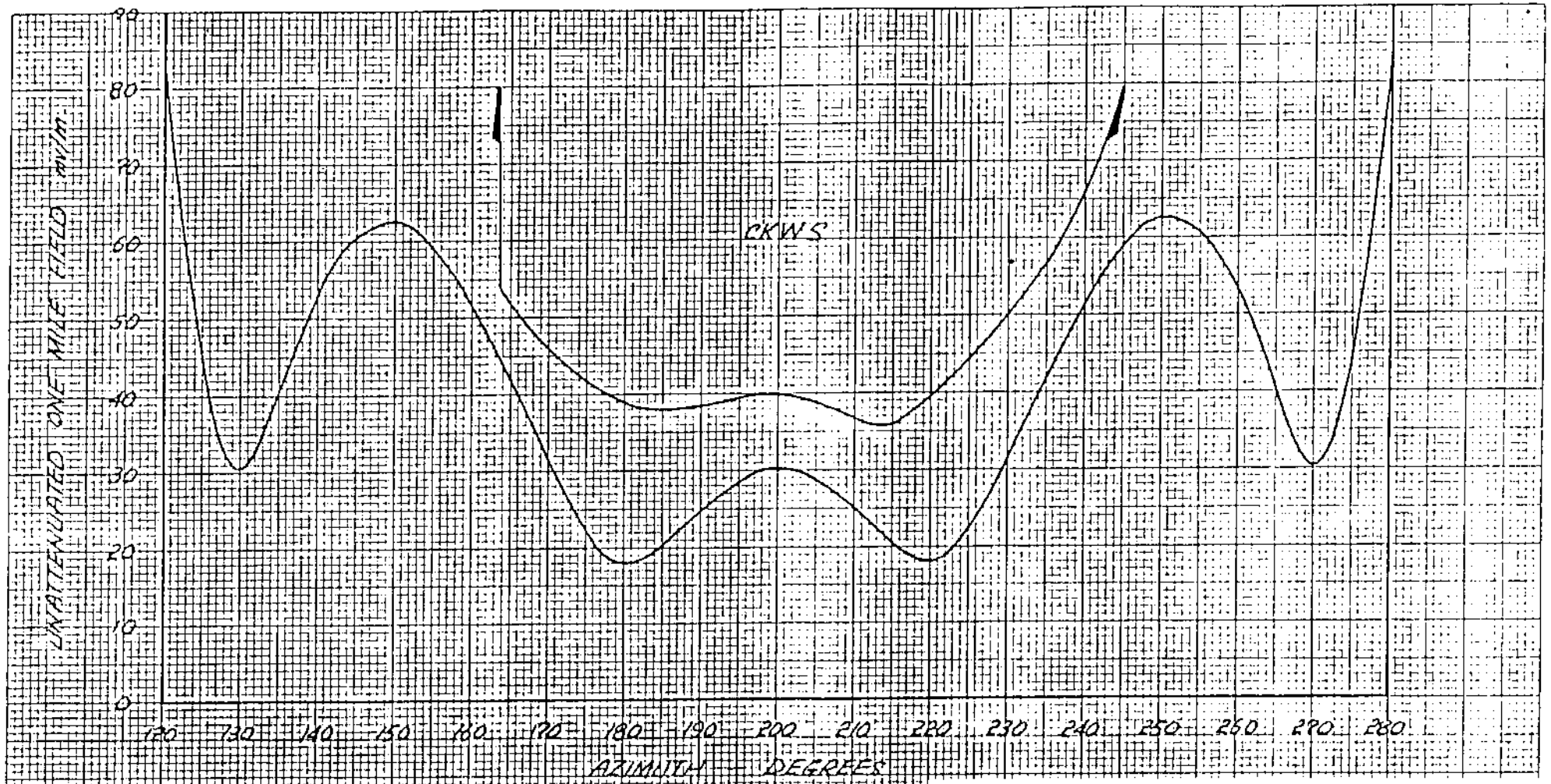


FIGURE 3A

HORIZONTAL RADIATION PATTERN
DAYTIME - EXPANDED PLOT

CKCH HULL, QUÉBEC
970 kHz 10 kW D/5 kW N DA-2 CLASS III
PROJECT #15703 REVISED MARCH 17, 1981

D.E.M. ALLEN & ASSOCIATES LTD
CONSULTING ENGINEERS

CKCH 970 kHz

CKCH

PROJECT #15703

DESCRIPTION SHEET - DIRECTIONAL ANTENNA

STATION: CKCH

MAIN STUDIO: Hull, Quebec

FREQUENCY: 970 kHz

POWER: 10 kW D/5 kW N CLASS: III

NOTIFICATION LIST NO.: 374

DATE: June 5, 1978

GEOGRAPHICAL LOCATION:

Latitude: 45° 22' 59" North
Longitude: 75° 48' 47" West

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-2

Number of Elements: 3 (Three)

Type of Elements: Guyed steel towers, uniform cross-section, base insulated for series feed

TOWER:	#1 (SW)	#2 (C)	#3 (NE)
Height above Base Insulator:	240' (85°)	240' (85°)	240' (85°)
Overall Height:	243'	243'	243'
Field Ratio:			
Nighttime	.549	1.0	.549
Daytime	.52	1.0	.52
Phasing:			
Nighttime	0°	-148.2°	+63.6°
Daytime	0°	-138°	+83.8°
Orientation:	Ref.	20°	20°
Spacing:	Ref.	173' (61.5°)	346' (123°)

GROUND SYSTEM: 120 radials of #10 Bare Soft Copper wire extend from the base of each tower for a distance of 406' (0.4 wavelength) with the exception of those joined along the common chords and those extending to the edge of the property. In addition, 120 radials, 50 ft. long, extend from the base of each tower.

PREDICTED EFFECTIVE FIELD:

Nighttime: 450 mV/m at 1 mile for 5 kW
201 mV/m at 1 mile for 1 kW

Daytime: 620 mV/m at 1 mile for 10 kW
196 mV/m at 1 mile for 1 kW

January 18, 1978

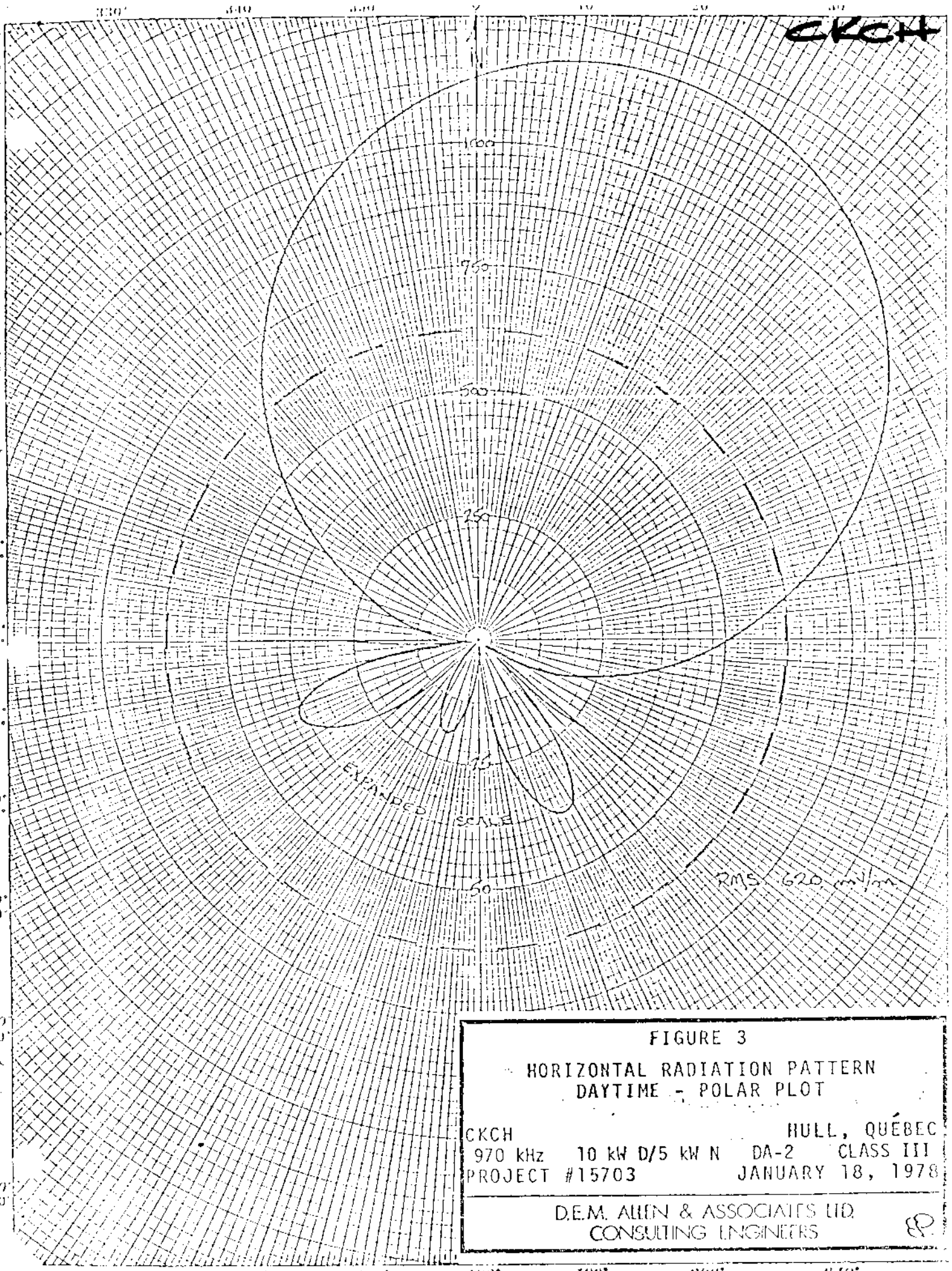


FIGURE 3

HORIZONTAL RADIATION PATTERN
DAYTIME - POLAR PLOT

CKCH HULL, QUÉBEC
970 kHz 10 kW D/5 kW N DA-2 CLASS III
PROJECT #15703 JANUARY 18, 1978

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

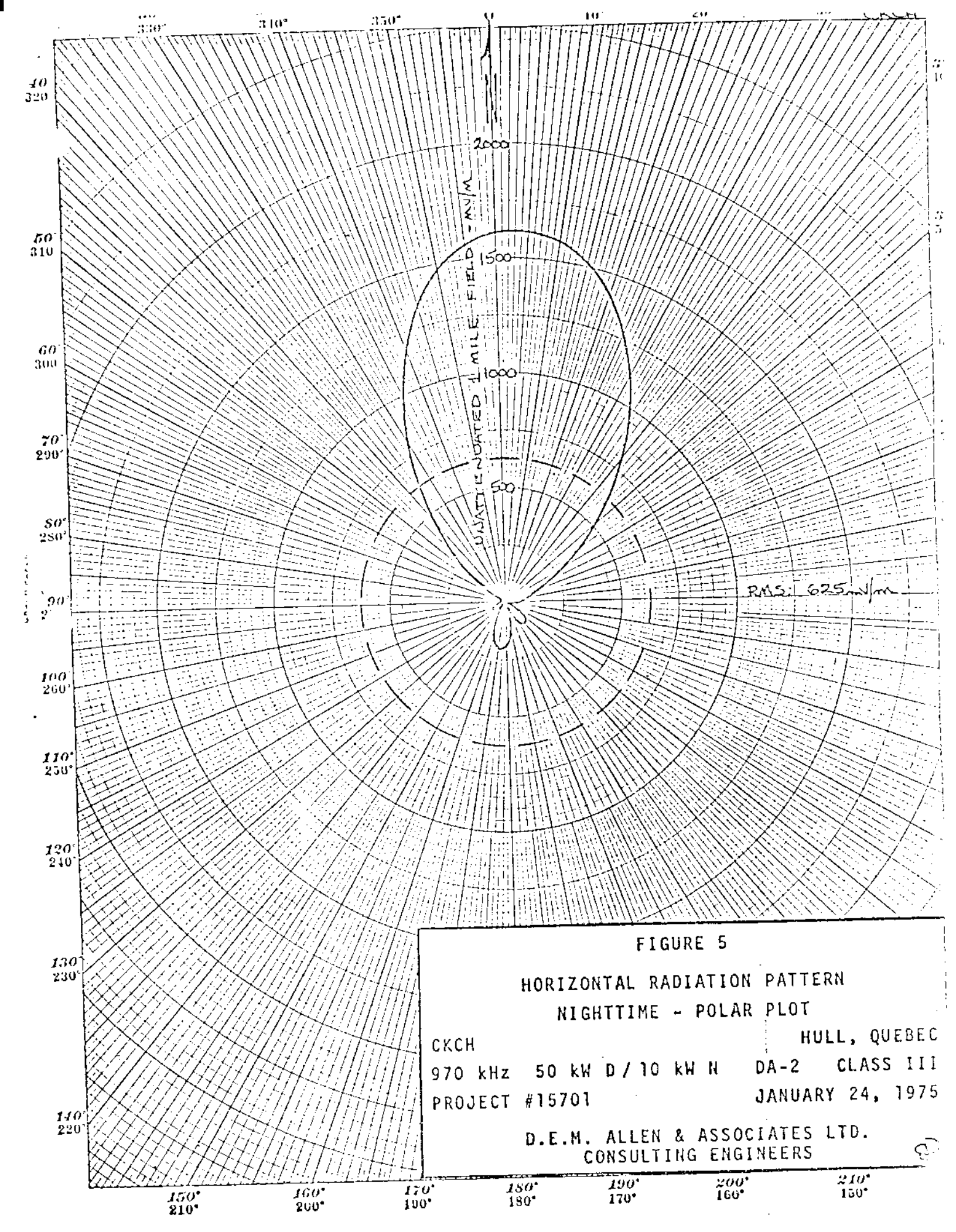


FIGURE 5

HORIZONTAL RADIATION PATTERN

NIGHTTIME - POLAR PLOT

CKCH HULL, QUEBEC

970 kHz 50 kW D / 10 kW N DA-2 CLASS III

PROJECT #15701 JANUARY 24, 1975

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

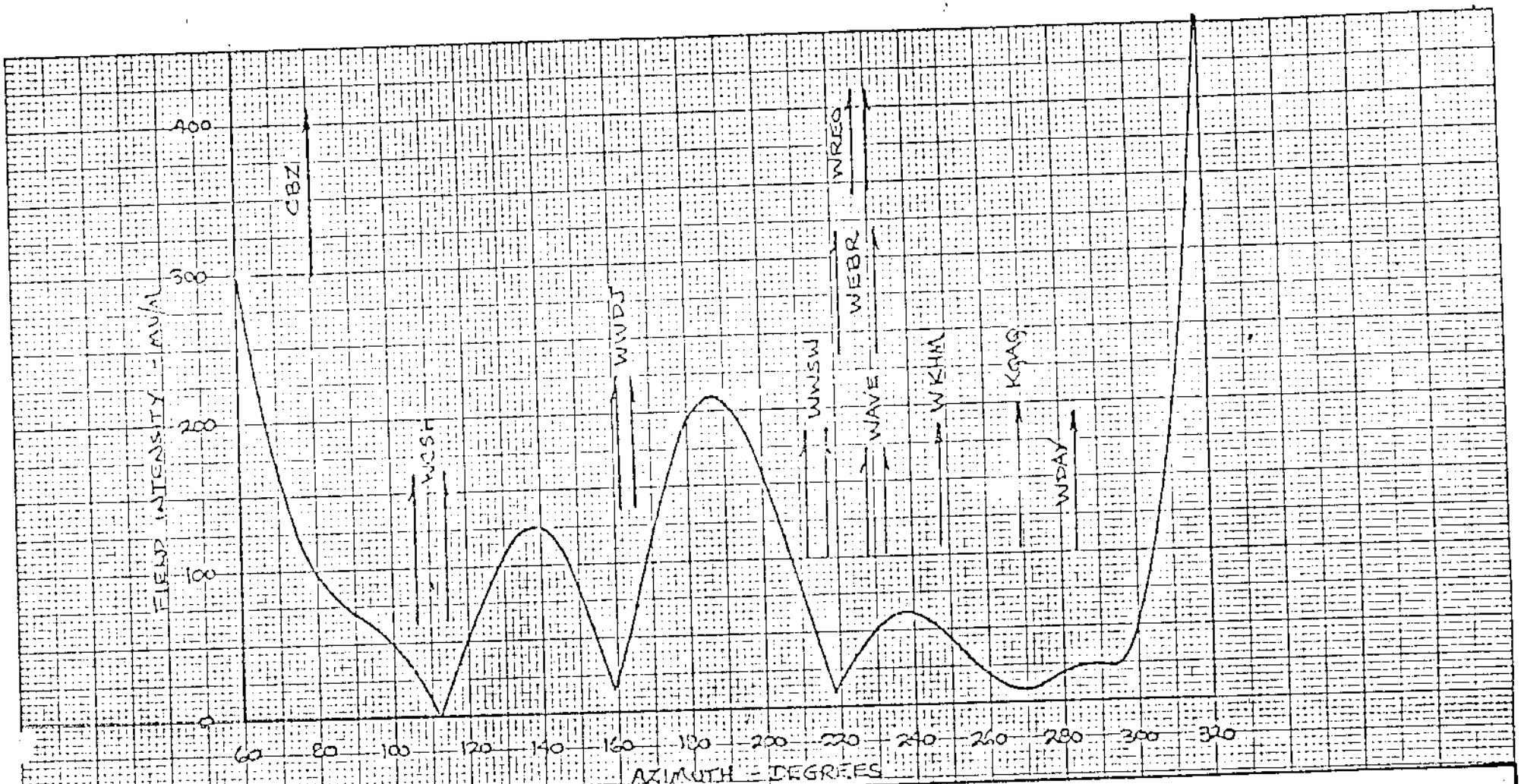


FIGURE 6

HORIZONTAL RADIATION PATTERN

NIGHTTIME - EXPANDED PLOT

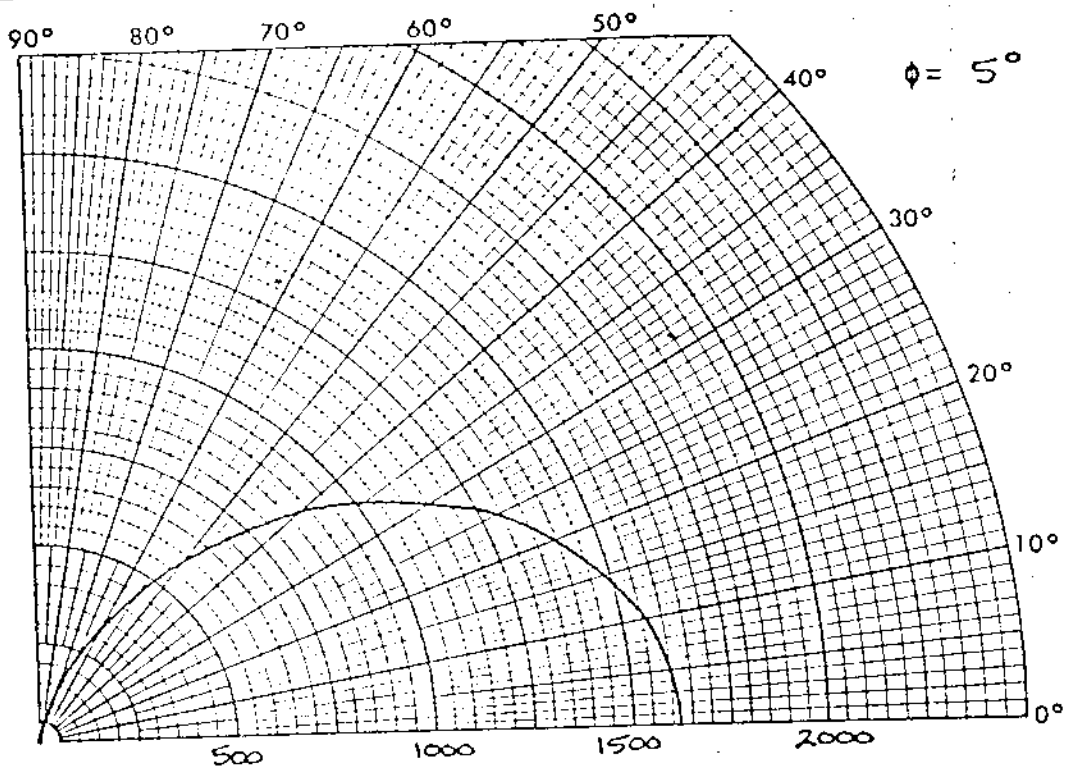
CKCH HULL, QUEBEC

970 kHz 50 kW D / 10 kW N DA-2 CLASS III

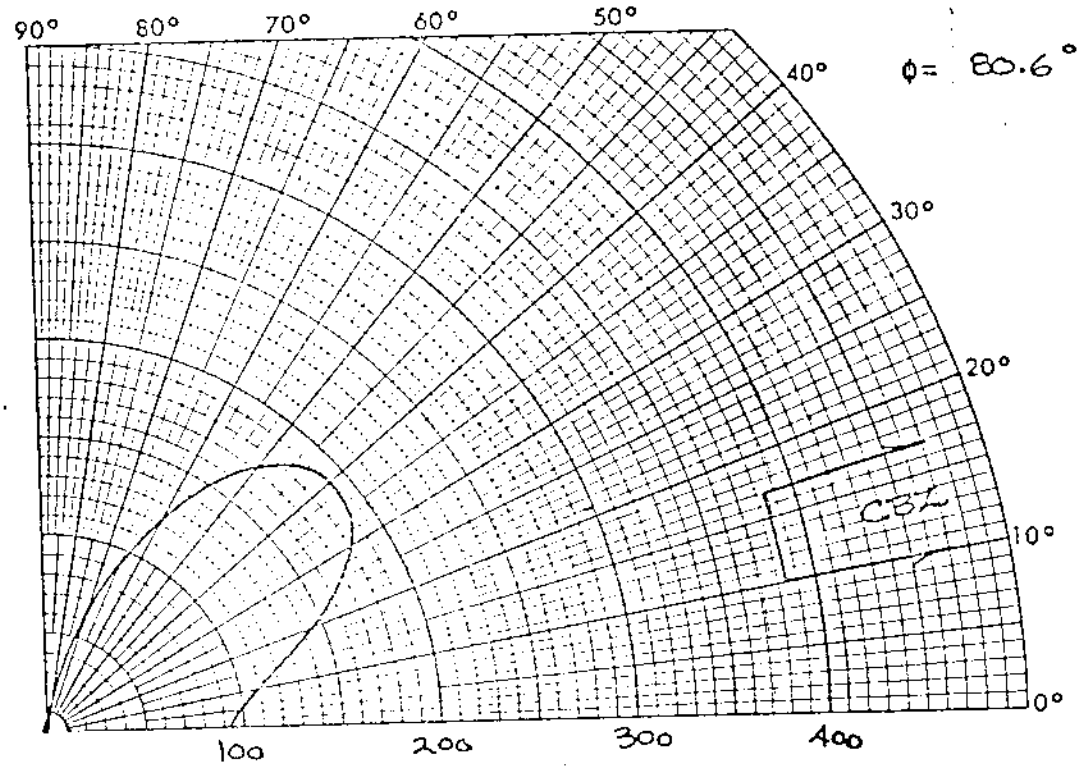
PROJECT #15701 JANUARY 24, 1975

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

CKCH



UNATTENUATED (MV/M) 1 MILE FIELD



UNATTENUATED (MV/M) 1 MILE FIELD

VERTICAL RADIATION PATTERNS

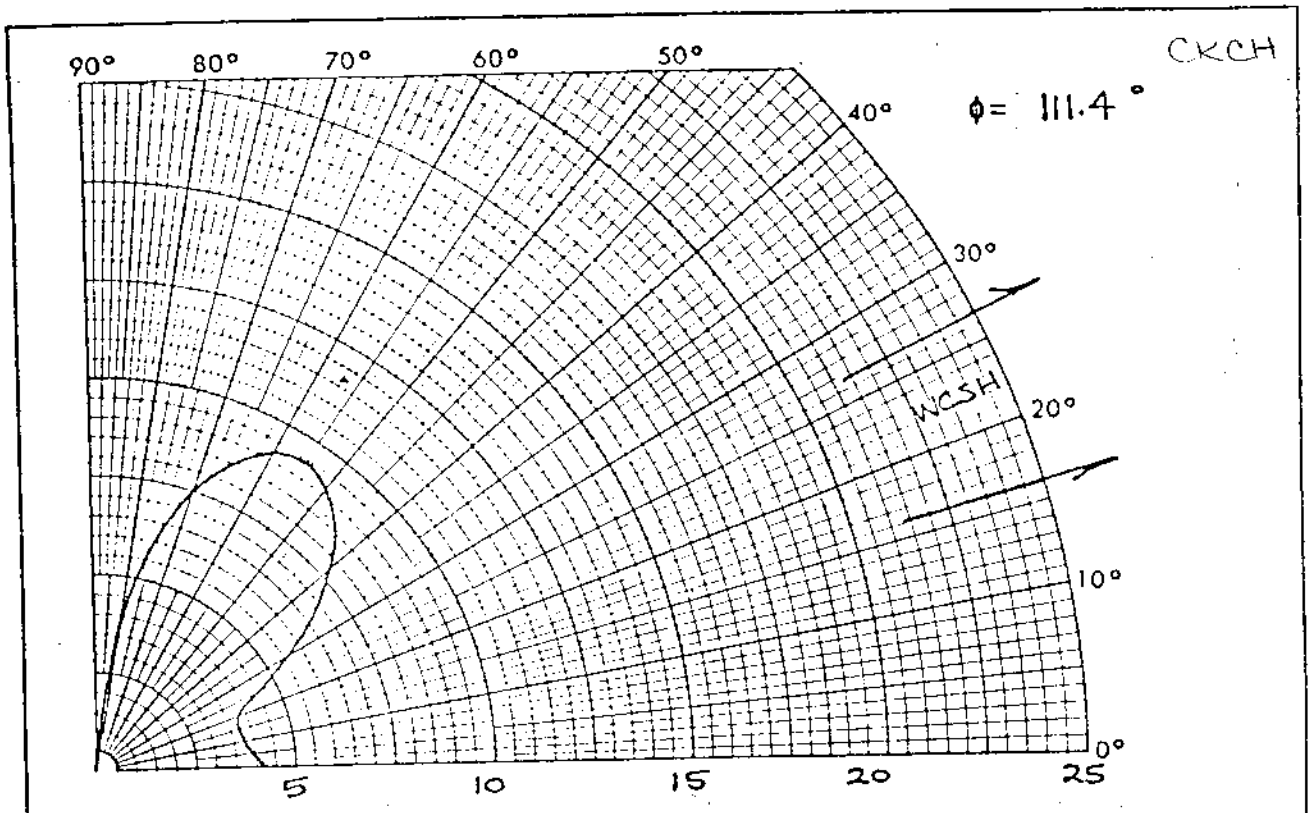
FIGURE 7

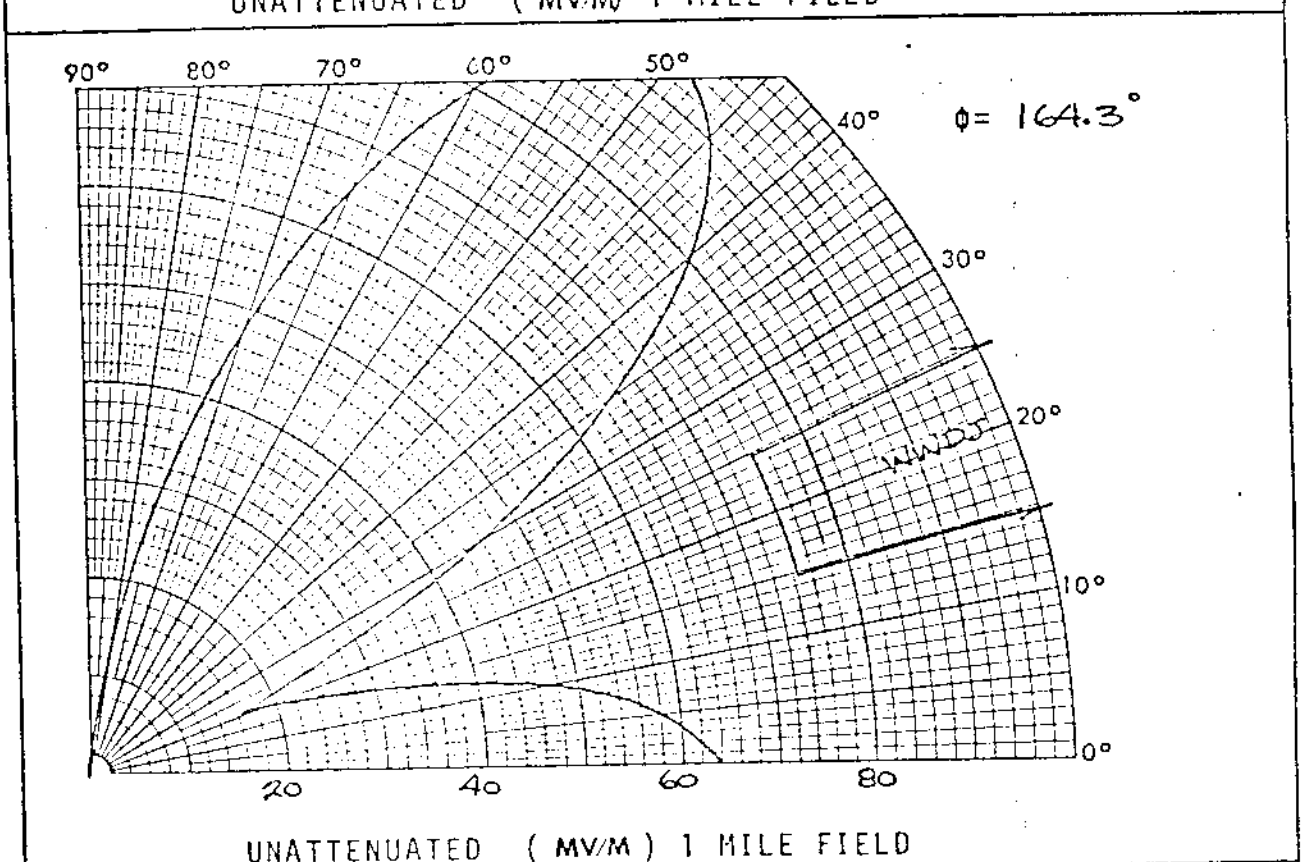
CKCH — HULL, QUEBEC

970 kHz — 50 kW D/10 kW N — DA-2 — CLASS III

PROJECT #15701 — JANUARY 24, 1975

D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS





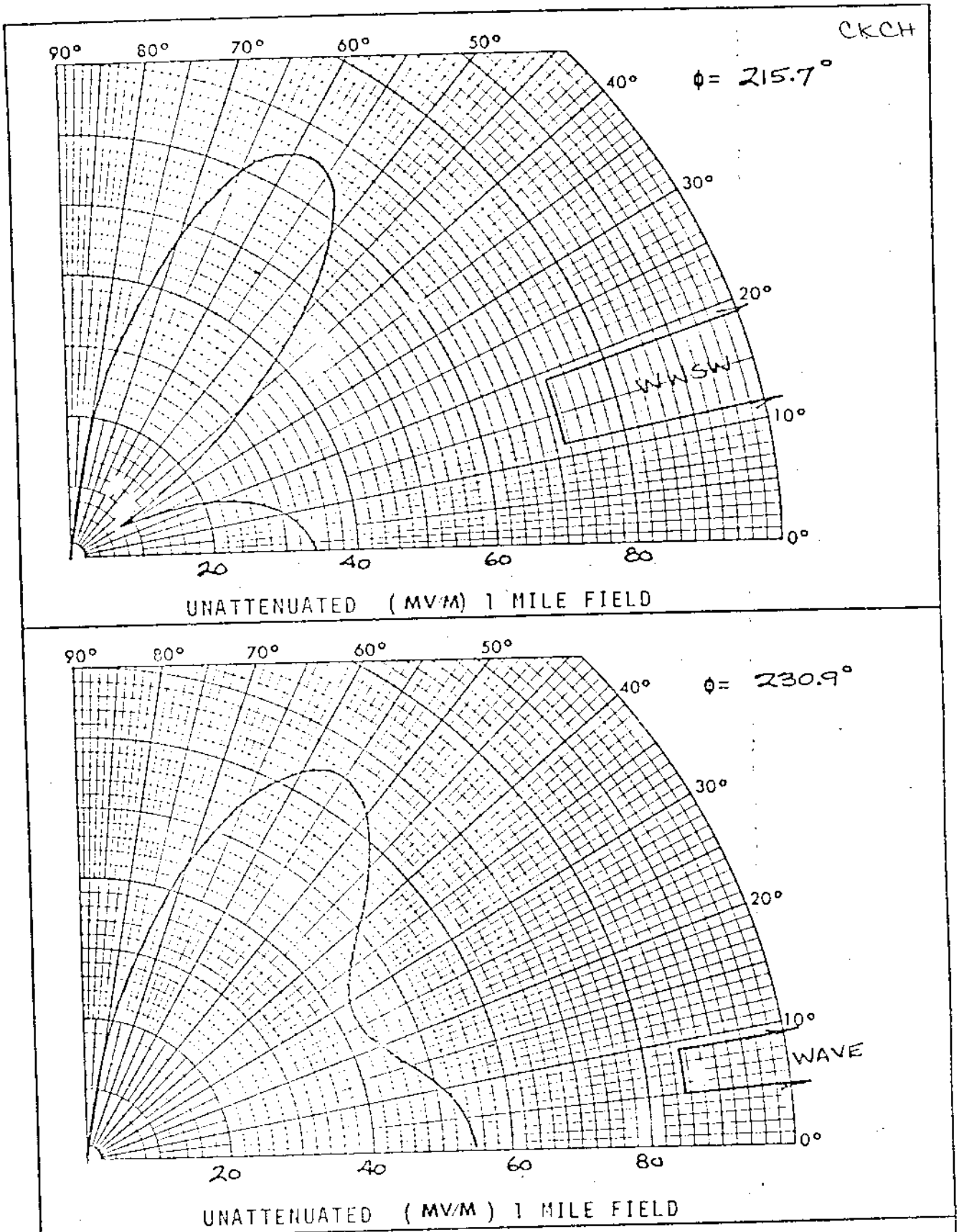
VERTICAL RADIATION PATTERNS

FIGURE 8

CKCH
970 kHz 50 kW D/10 kW N DA-2
PROJECT #15701

HULL, QUEBEC
CLASS III
JANUARY 24, 1975

D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS



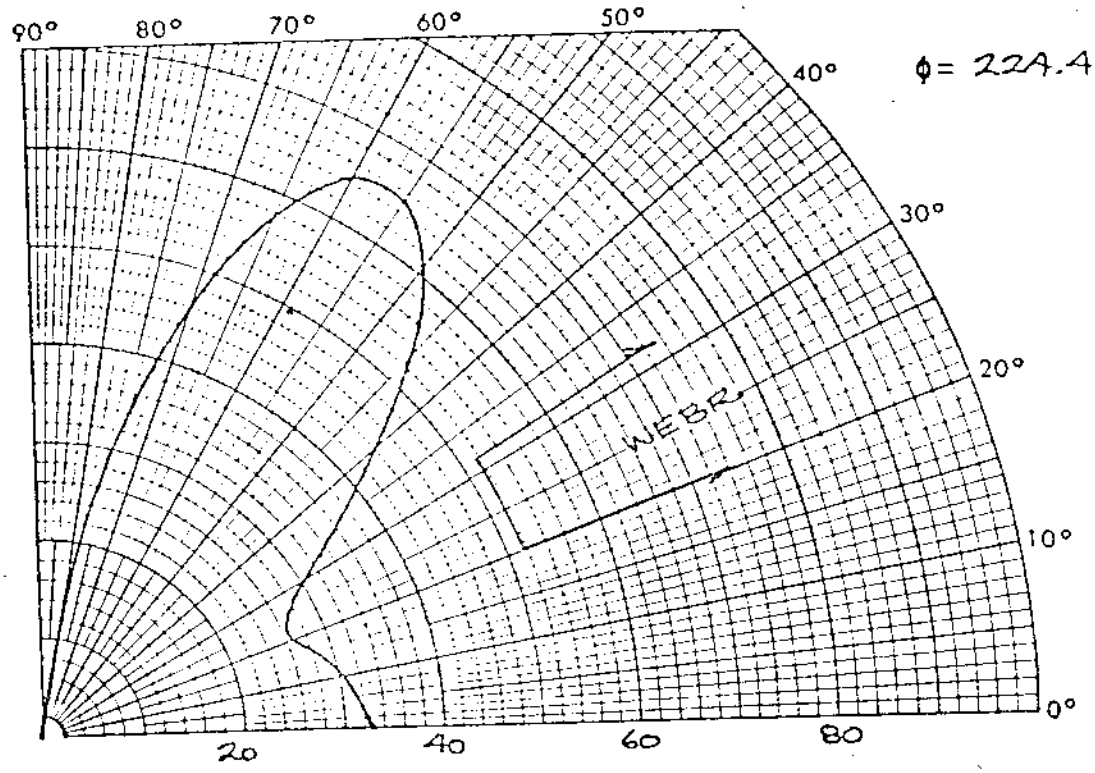
VERTICAL RADIATION PATTERNS

FIGURE 9

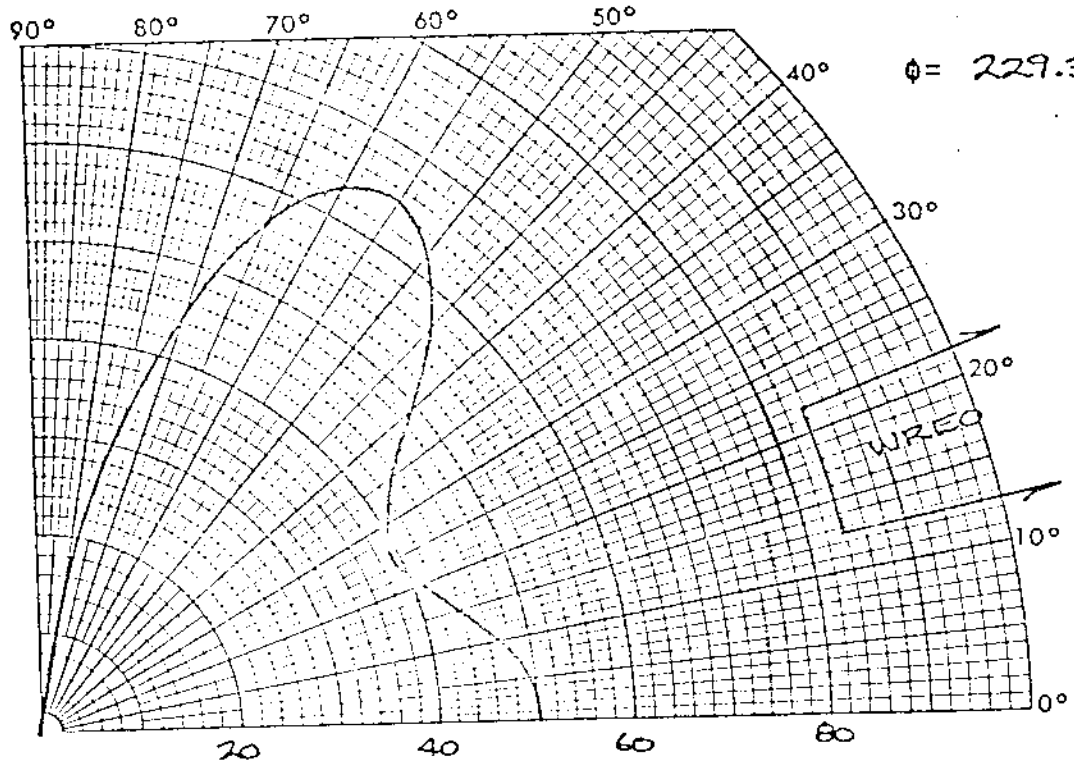
CKCH
970 kHz 50 kW D/10 kW N DA-2
PROJECT #15701

HULL, QUEBEC
CLASS III
JANUARY 24, 1975

D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS



UNATTENUATED (MV/M) 1 MILE FIELD



UNATTENUATED (MV/M) 1 MILE FIELD

VERTICAL RADIATION PATTERNS

FIGURE 10

CKCH
970 kHz 50 kW D/10 kW N DA-2
PROJECT #15701

HULL, QUEBEC
CLASS III
JANUARY 24, 1975

D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS

KAKC
970 kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KAKC

Main Studio: Tulsa, Oklahoma

Frequency: 970 kHz

Power: 1kw Night 2.5kw Day

Notification List No. 1789

Date: September 12, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 36° 11' 46"
West Longitude: 96° 02' 22"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 6
Type of elements: Series excited, uniform cross-section, guyed, vertical steel

TOWER:	NE(#1)	SSW(#2)	C(#3)	SW(#4)	NW(#5)	(WSW#6)
HEIGHT ABOVE INSULATORS:	260'	260'	260'	260'(92.3°)	338'	338'(120°)
NIGHT PHASING:	—	—	-21.2	-71.1	0	+6.8
NIGHT FIELD RATIO:	—	—	0.587	0.285	1.0	0.975
DAY PHASING:	-105.7	-73.6	0	+3.9	-76.0	-136.7
DAY FIELD RATIO:	0.65	0.07	1.0	0.45	0.258	0.313

SPACING AND ORIENTATION: With Tower #3 as reference, Tower #1 is spaced 232'(82.4°) on an azimuth of 49.9° true; Tower #2 is spaced 371'(131.5°) on an azimuth of 192.6° true; Tower #4 is spaced 609' (216°) on an azimuth of 216.3° true; Tower #5 is spaced 568' (201.6°) on an azimuth of 329.1° true and Tower #6 is spaced 634' (225°) on an azimuth of 260.4° true.

GROUND SYSTEM: 120-220' to 255' equally spaced copper radials plus 120-50' interspaced radials about each tower.

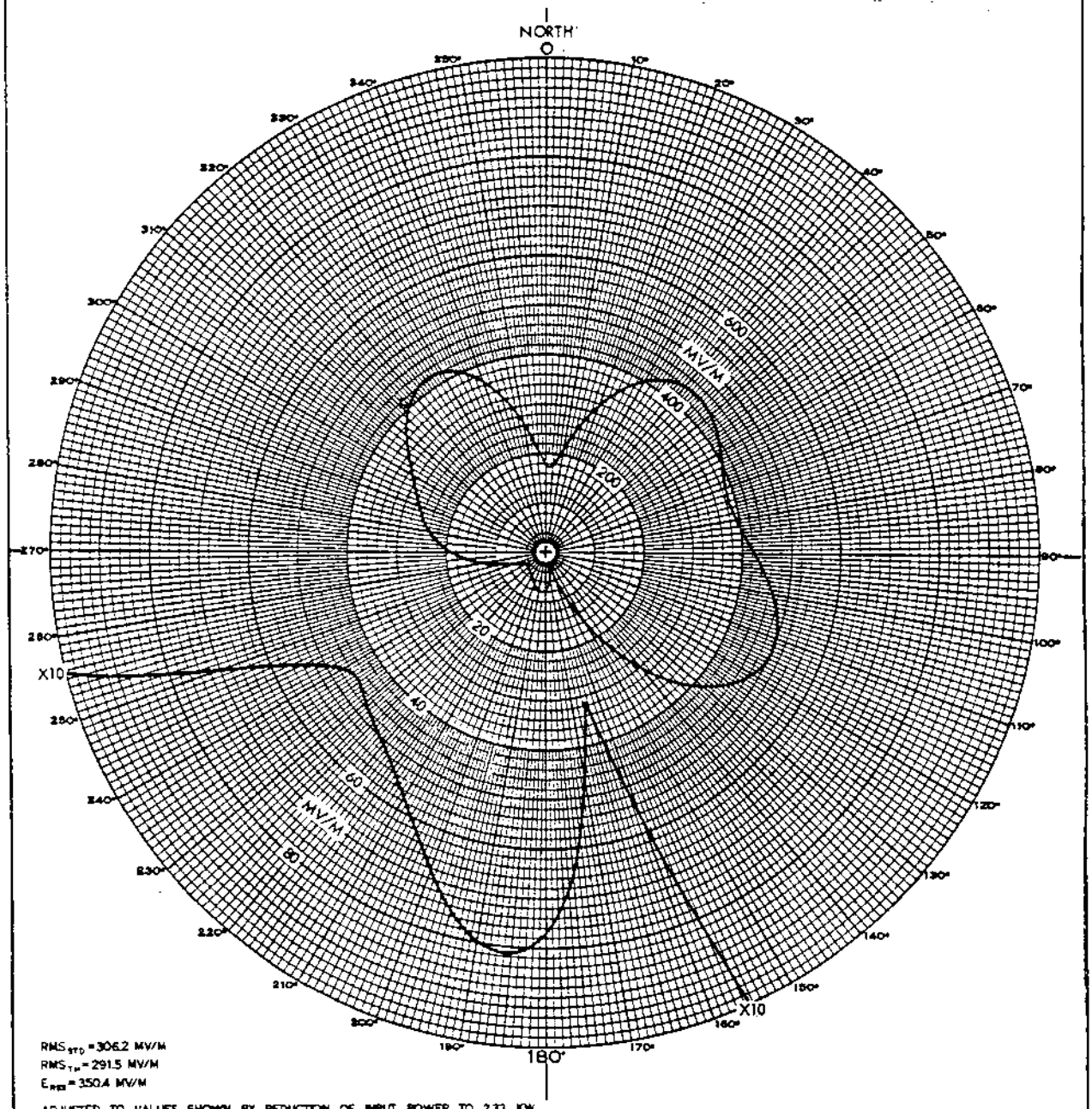
KAKC
970 kHz

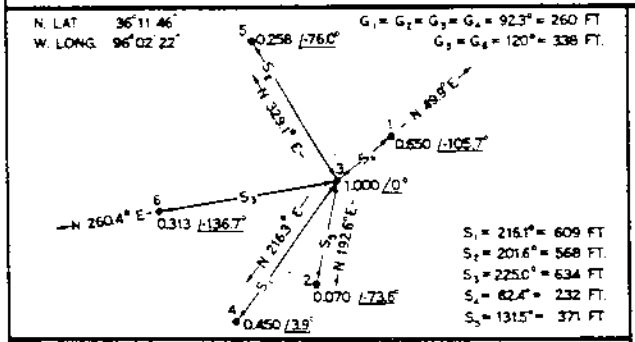
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	291.5 mv/m	350.4 mv/m	306.2 mv/m
Night	175.9 mv/m	313.9 mv/m	184.9 mv/m

Note: Please retain the Nighttime directional antenna radiation pattern notified for Station KAKC in United States Change List Number 1726, dated March 24, 1977 and attach to this Revised Description Sheet and Daytime pattern. This notification concerns only a change in the Daytime operation of the station with Nighttime operation continued as previously notified.

KAKC
970KHz





PROPOSED STANDARD HORIZONTAL RADIATION

DAYTIME

UNATTENUATED FIELD STRENGTH AT ONE MILE

HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

RADIO STATION KAKC
970KHZ. 1KW. 2.5KW-LS. DA-2
TULSA, OKLAHOMA

760305.4

FIGURE 4

KAKC

PROPOSED DAY
(12-12-58g)

Station KAKC
Tulsa, Oklahoma

500w, 1kw-LS, DA-2, U
970 KC

Granted license 2/17/59 to change location & to make changes in DA-system (decrease height)

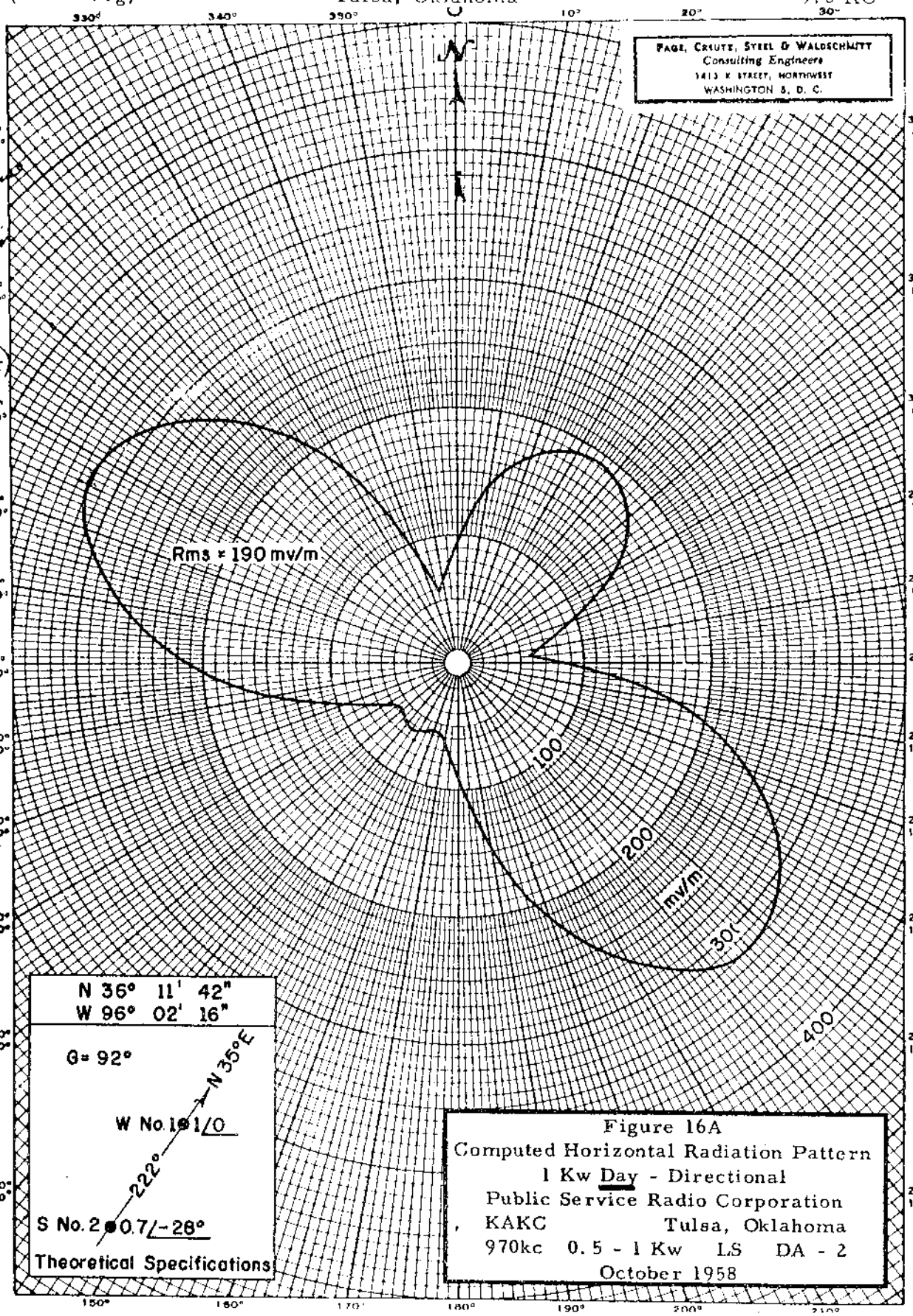


Figure 16A
Computed Horizontal Radiation Pattern
1 Kw Day - Directional
Public Service Radio Corporation
KAKC Tulsa, Oklahoma
970kc 0.5 - 1 Kw LS DA - 2
October 1958

FCC File No. BP-11462
Accepted

KAKC
Tulsa, Oklahoma

970 KC

KAKC

MEASURED DAY
(12-12-58g)

Station KAKC
Tulsa, Oklahoma

500w, 1kw-LS, DA-2, U
970 KC

granted license
2/17/59

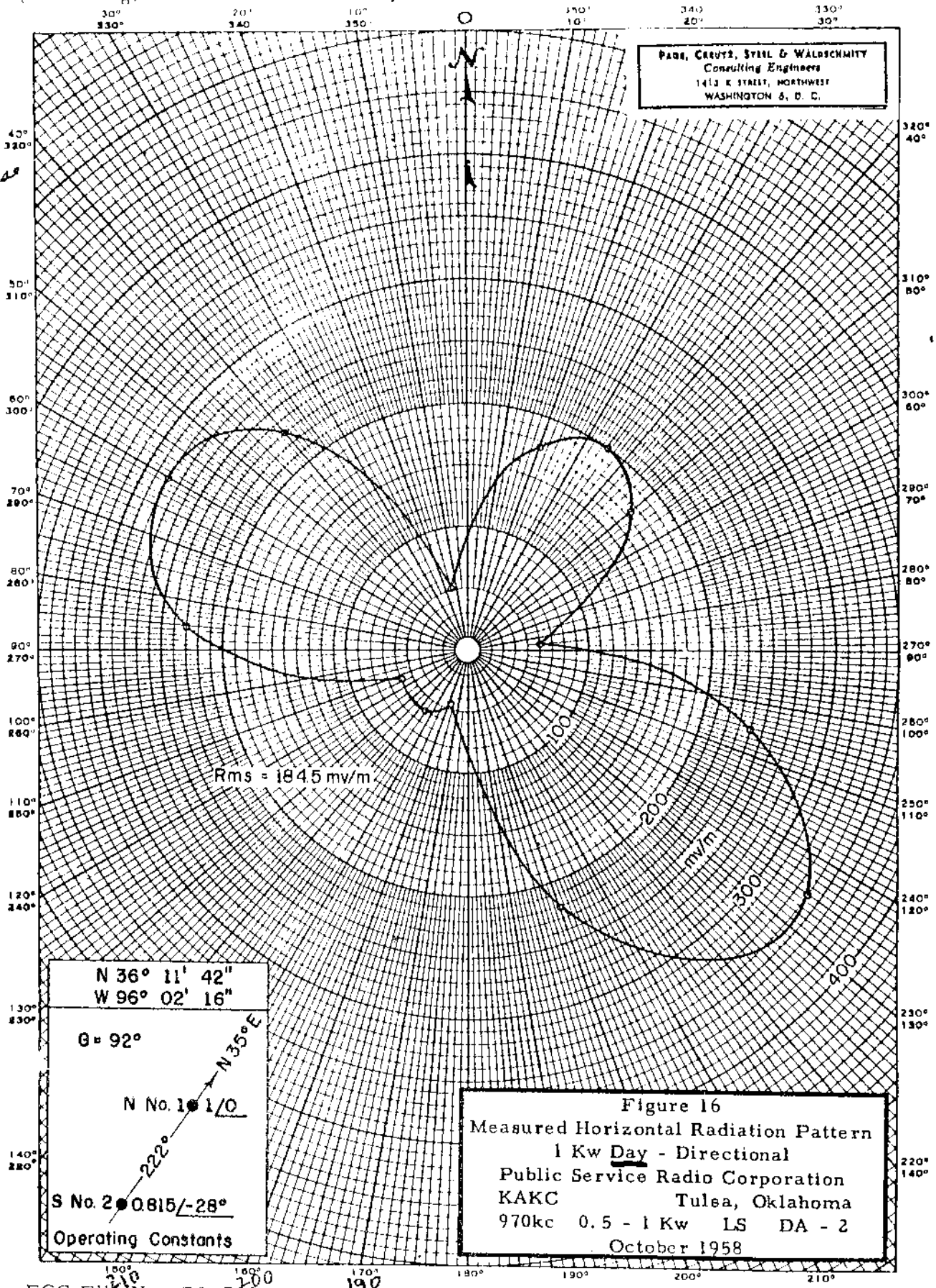


Figure 16
Measured Horizontal Radiation Pattern
1 Kw Day - Directional
Public Service Radio Corporation
KAKC Tulsa, Oklahoma
970kc 0.5 - 1 Kw LS DA - 2
October 1958

FCC File No. BL-7293
Accepted 11-25-58

KAKC
Tulsa, Oklahoma

970 KC

KAKC

MEASURED NON-DA
(12-12-58g)

Station KAKC
Tulsa, Oklahoma

500w, 1kw-LS, DA-2, U
970 KC

Granted license 2/17/59

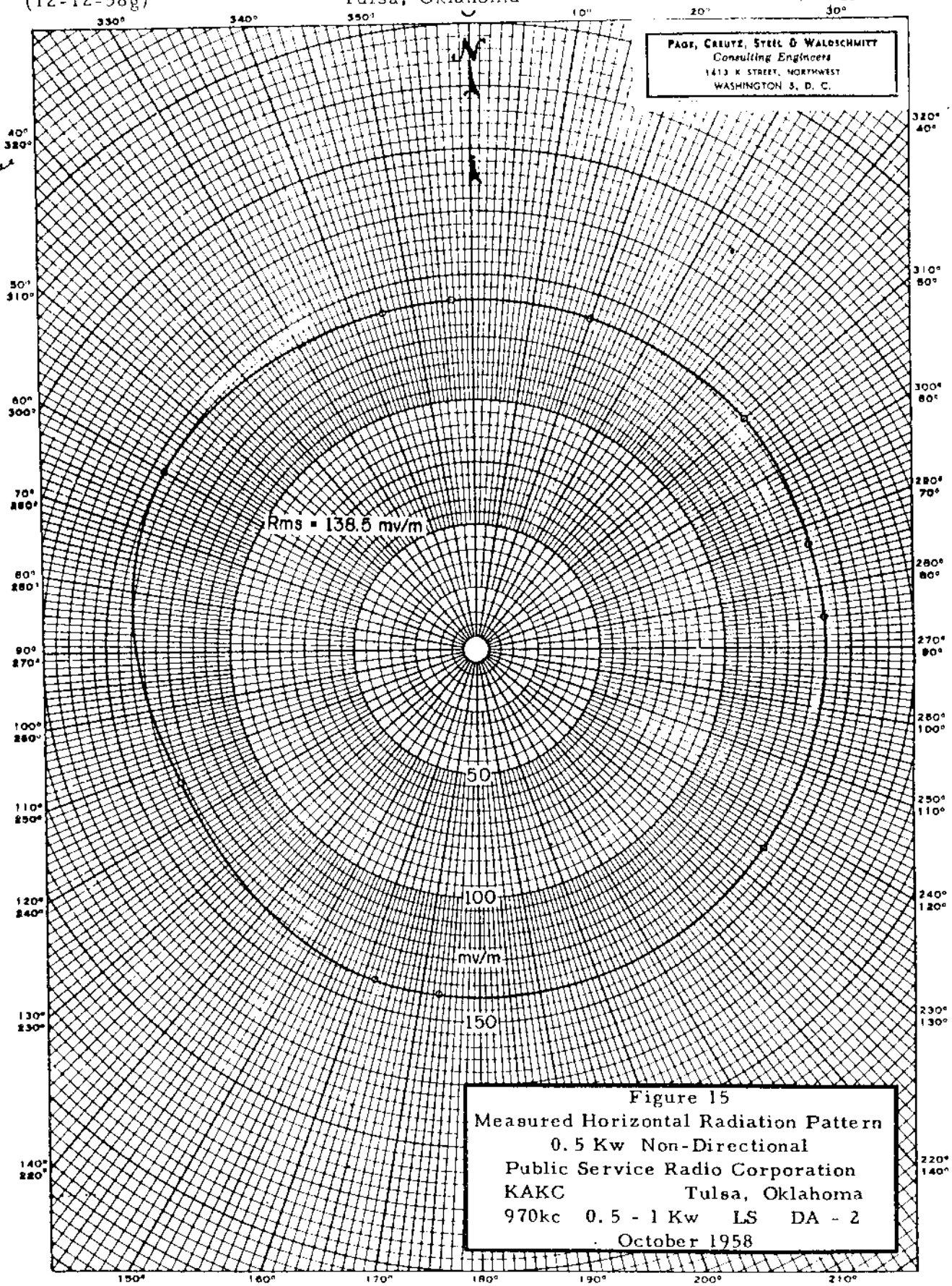


Figure 15
Measured Horizontal Radiation Pattern
0.5 Kw Non-Directional
Public Service Radio Corporation
KAKC Tulsa, Oklahoma
970kc 0.5 - 1 Kw LS DA - 2
October 1958

FCC File No. BL-7293
Accepted 11-25-58

KAKC
Tulsa, Oklahoma

970 KC

KAKC

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KAKC | Main Studio: Tulsa, Oklahoma

Frequency: 970 kHz | Power: 1 kW

Notification List No. 1726 | Date: March 24, 1977 | Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 36° 11' 42"
West Longitude: 96° 02' 16"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 6
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	W(#6)	N(#5)	SC(#2)	S(#4)	NE(#1)	E(#3)
HEIGHT ABOVE INSULATORS:	338'	338'(120°)	260'	260'	260'	260' (92.3°
NIGHT PHASING:	+6.8°	0°	-	-71.1°	-	-21.2°
NIGHT FIELD RATIO:	0.975	1.0	-	0.285	-	0.587
DAY PHASING:	-	-	-28°	-	0°	-
DAY FIELD RATIO:	-	-	0.7	-	1.0	-

SPACING AND ORIENTATION: Nighttime, from reference tower #3, tower #5 is spaced 568' (201.6°) on a line bearing 329.1° true, tower #6 is spaced 634' (225.0°) in length on a line bearing 260.4° true, and tower #4 is spaced 609' (216.1°) on a line bearing 216.3° true. Daytime, elements #1 and #2 spaced 624' (222°) on a line bearing 35° true.

GROUND SYSTEM: 120-255' equally spaced copper radials plus 120-50' interspaced radials or a 32' square ground screen about each tower. Radials are shortened and bonded to transverse straps along intersection between towers. Center of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

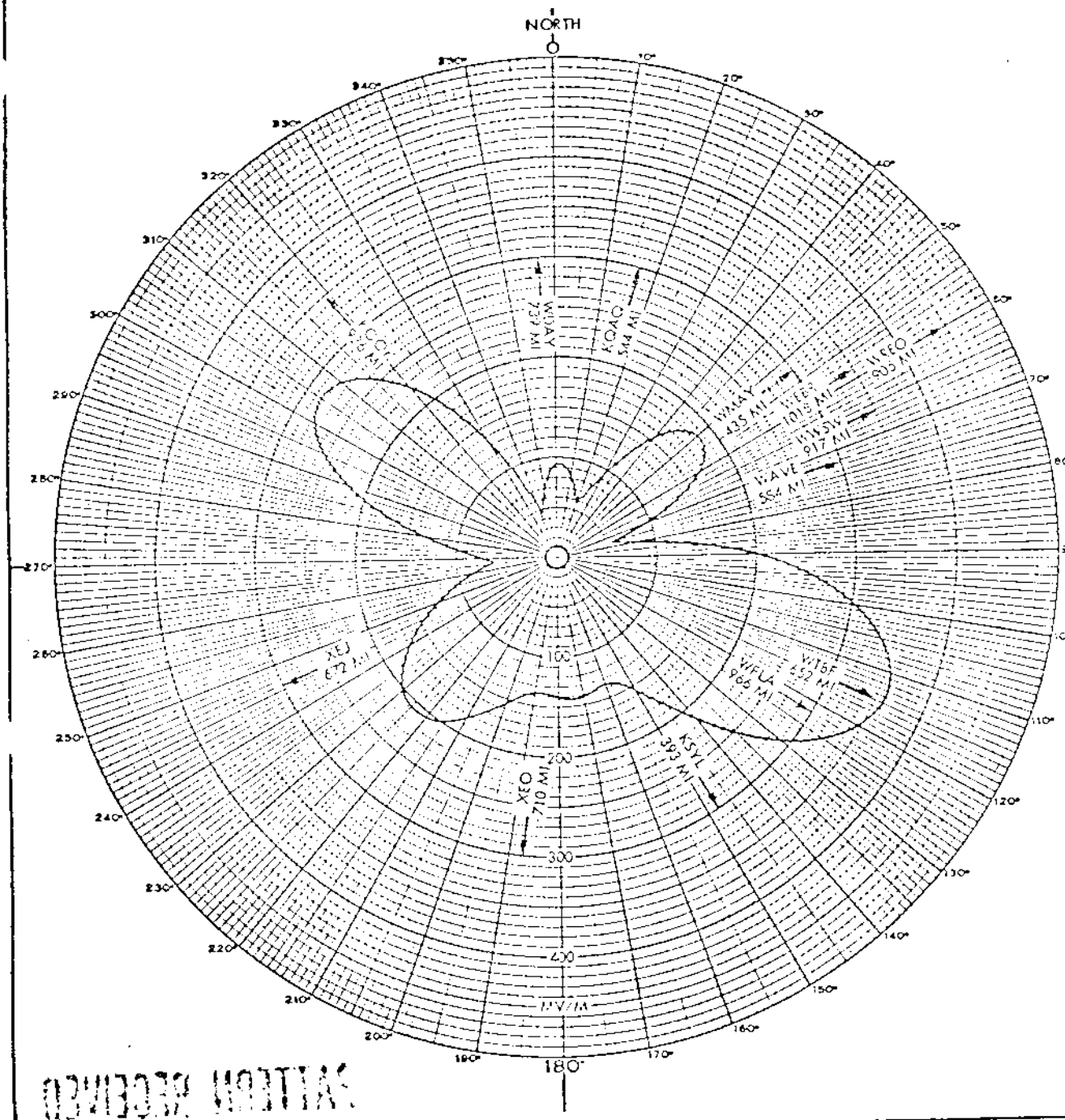
	THEORETICAL		STANDARD
	RMS	RSS	RMS
Day	190 mv/m	- mv/m	- mv/m
Night	175.9 mv/m	313.9 mv/m	184.9 mv/m

(Cont'd)

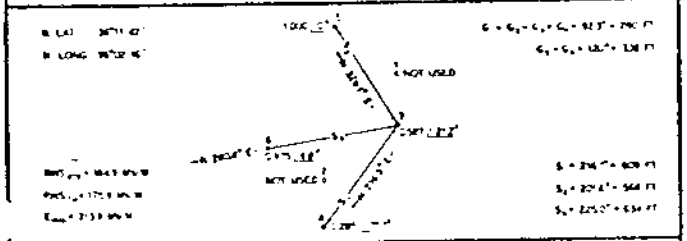
Note: Please retain the Daytime directional antenna radiation pattern notified for Station KAKC in United States Change List Number 318 dated June 1, 1949 and attach to this Revised Description Sheet and Nighttime patterns. This notification concerns only a change in the Nighttime operation of the station with Daytime operation continued as previously notified.

CTR NO 30826A4

KAKC



Standard Pattern



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

RADIO STATION KAKC
970 KHZ 1 KW. DA-2
TULSA, OKLAHOMA

PROPOSED STANDARD
HORIZONTAL RADIATION
NIGHTTIME

UNATTENUATED FIELD STRENGTH
AT ONE MILE

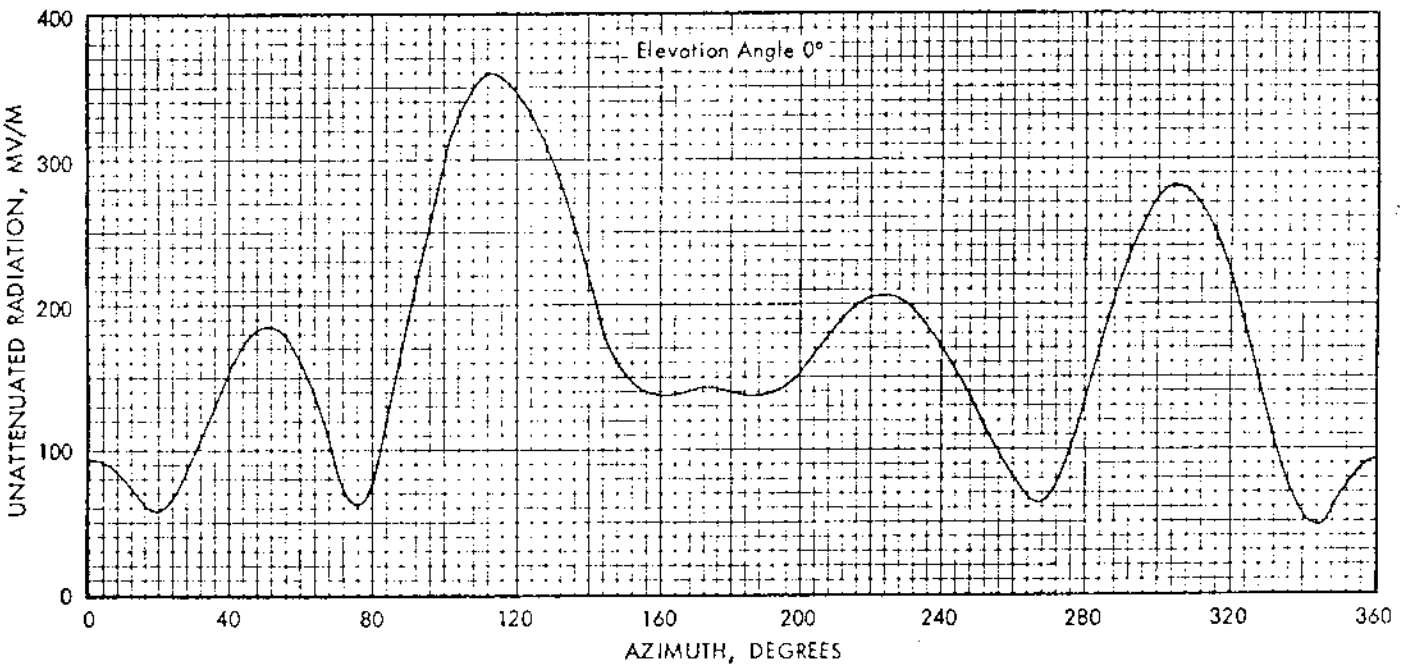
7509094

FIGURE 4A

KAKC

RADIO STATION KAKC

CALCULATED STANDARD RADIATION



Standard Pattern

Hammett & Edison, Inc.
Consulting Engineers

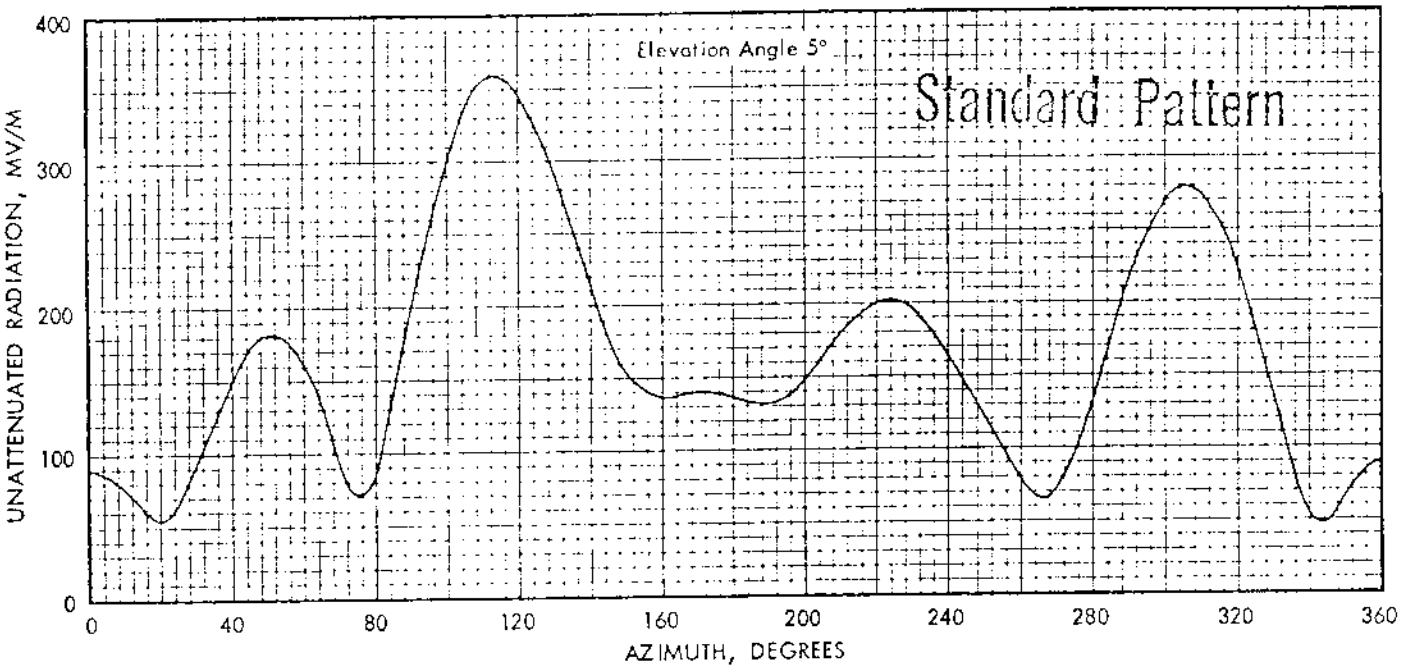
750909.2

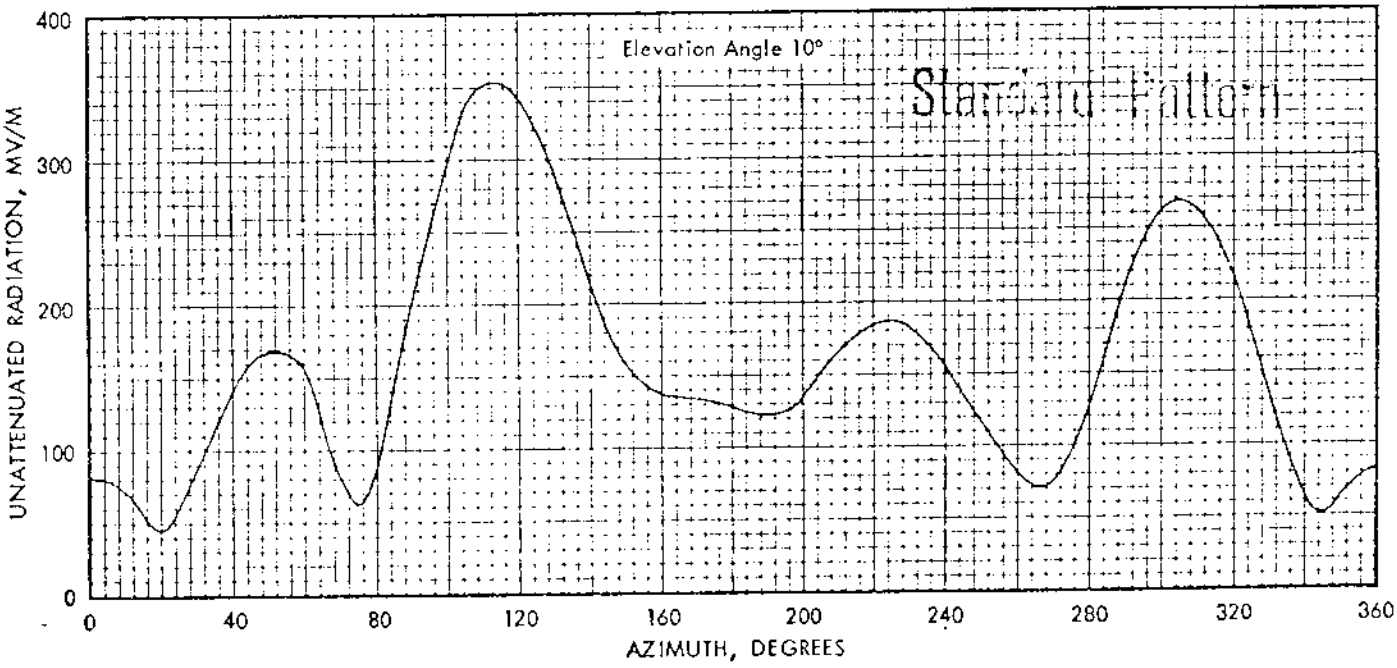
FIGURE 4B

KAKC

RADIO STATION KAKC

CALCULATED STANDARD RADIATION





Hammett & Edison, Inc.
Consulting Engineers

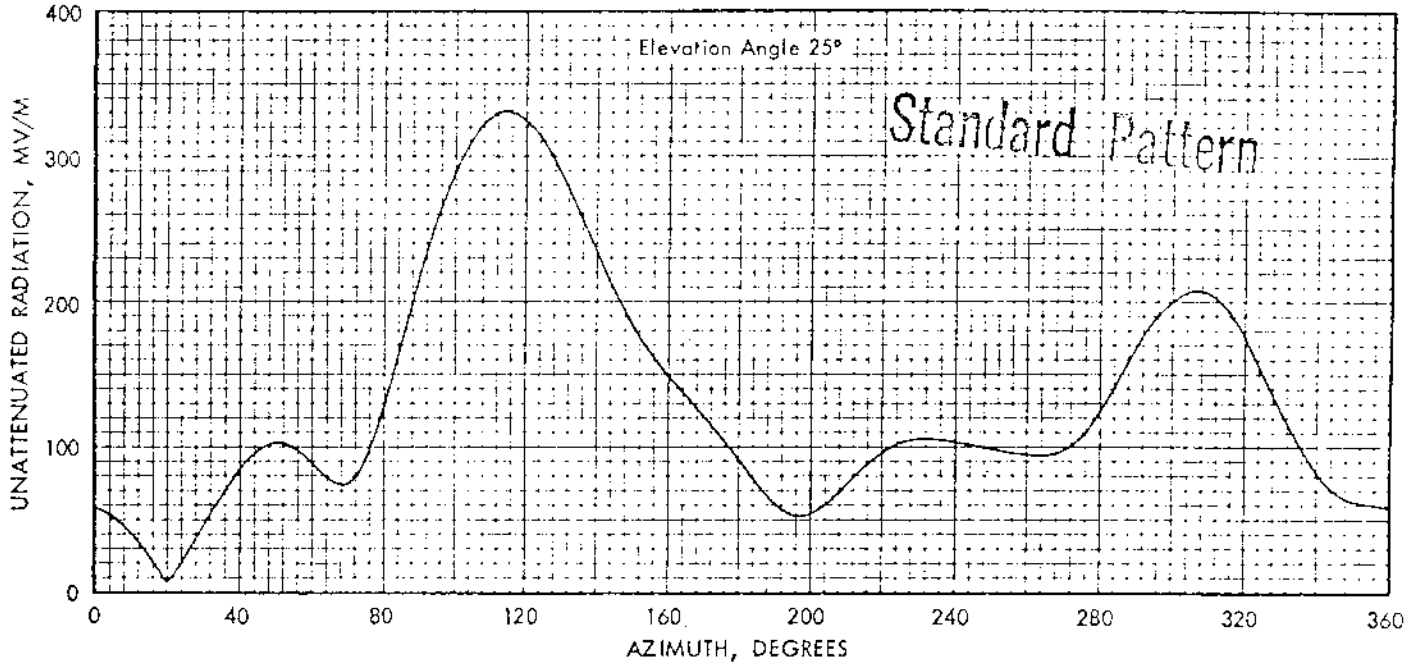
750909.2

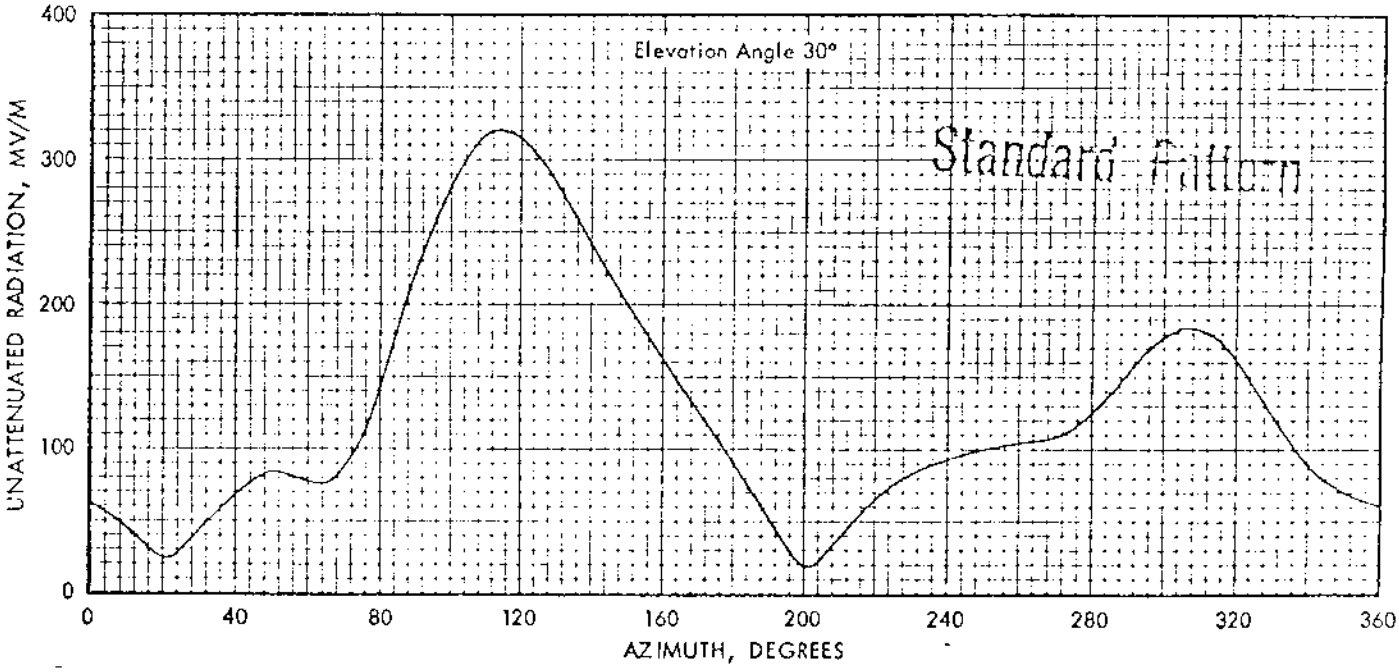
FIGURE 4C

KAKC

RADIO STATION KAKC

CALCULATED STANDARD RADIATION





Hammett & Edison, Inc.
Consulting Engineers

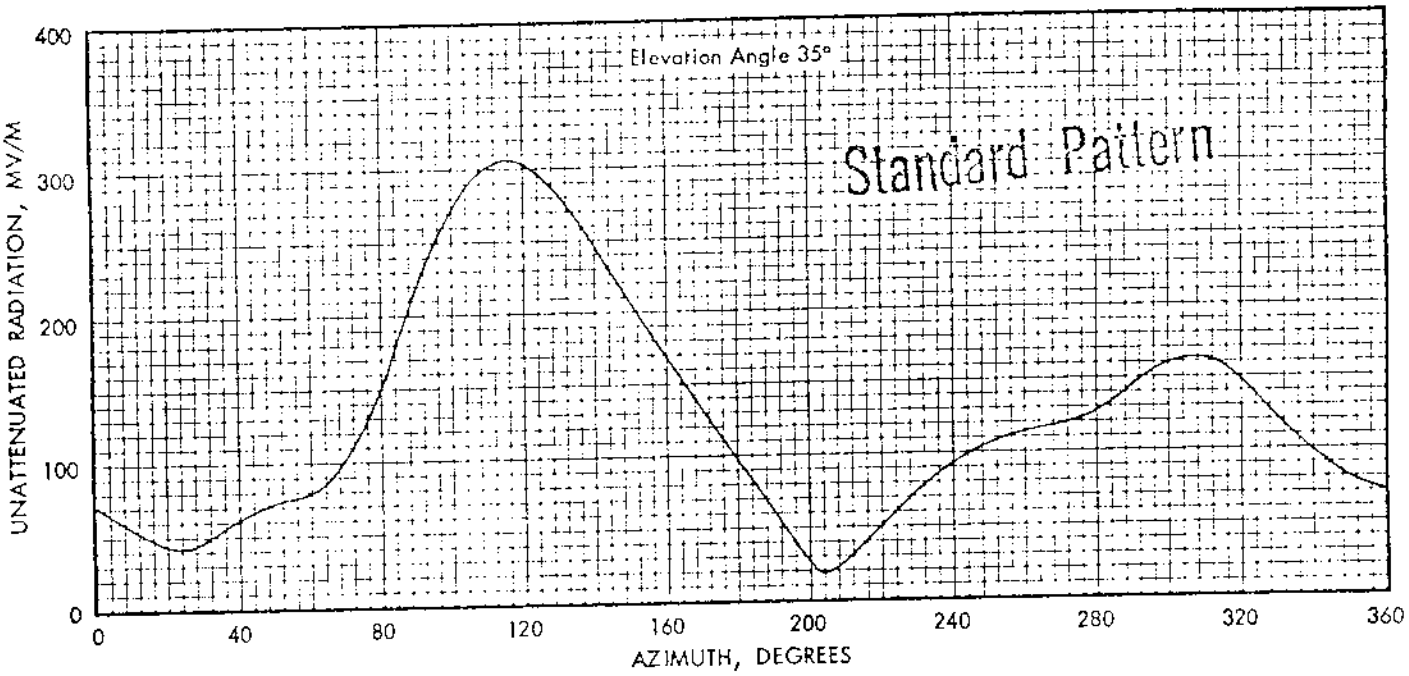
750909.2

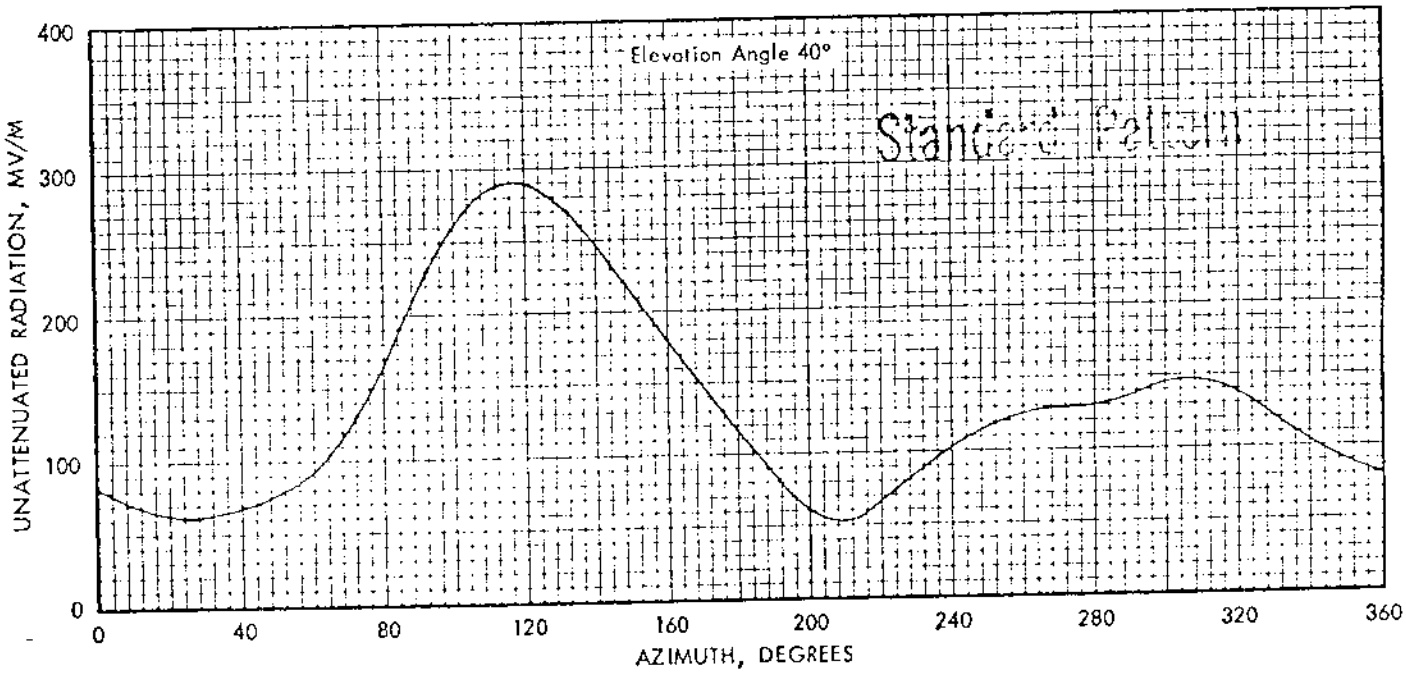
FIGURE 4E

KAKC

RADIO STATION KAKC

CALCULATED STANDARD RADIATION





Hammett & Edison, Inc.
Consulting Engineers

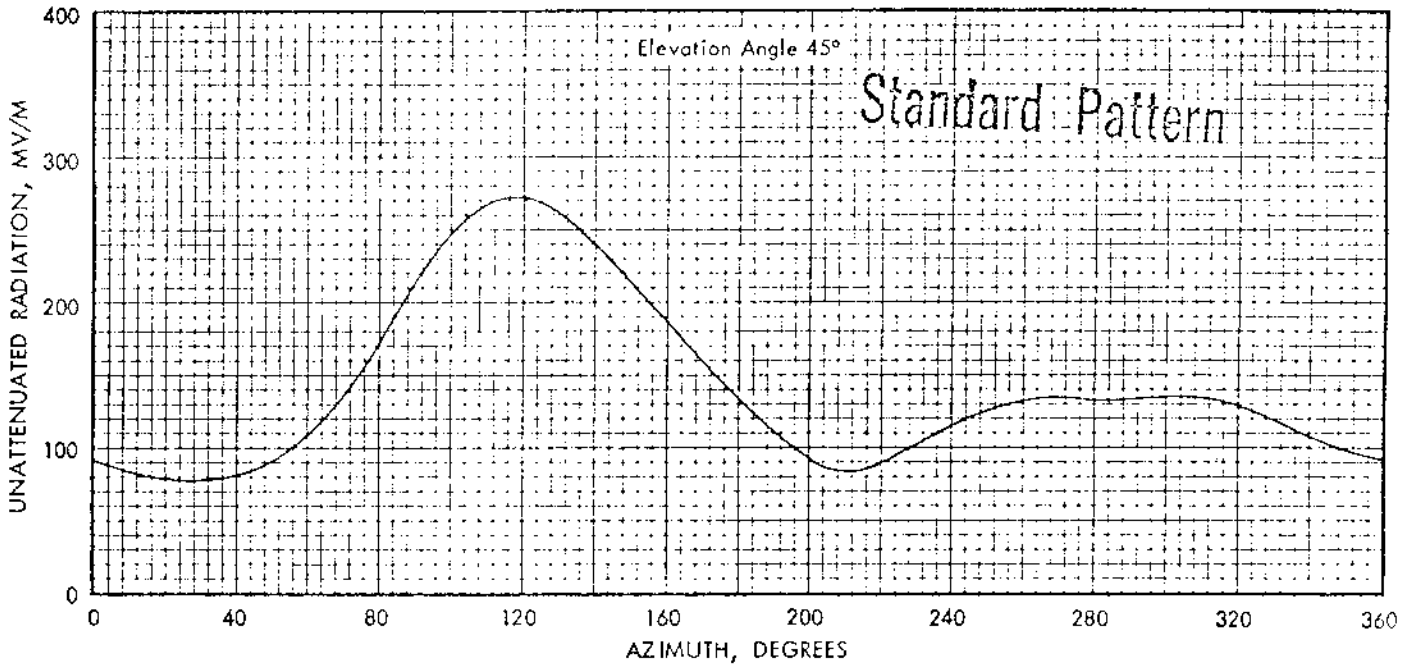
FIGURE 4F

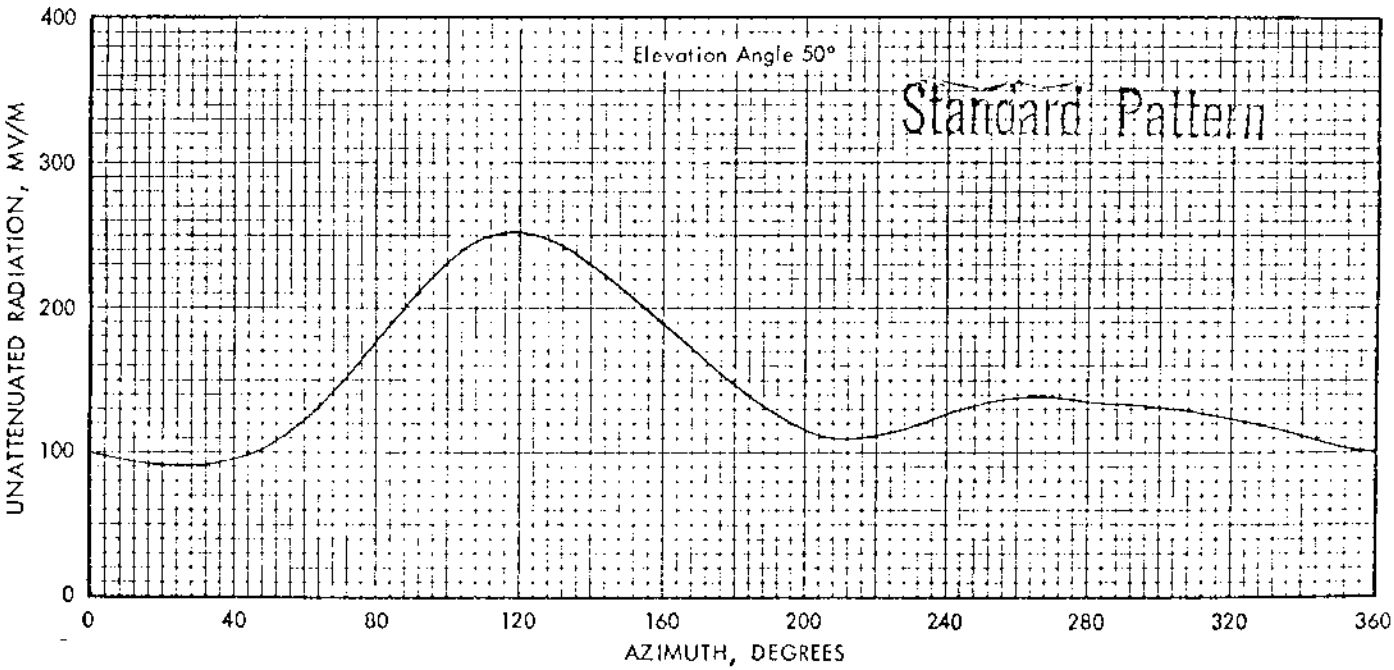
750909.2

KAKC

RADIO STATION KAKC

CALCULATED STANDARD RADIATION





Hammett & Edison, Inc.
Consulting Engineers

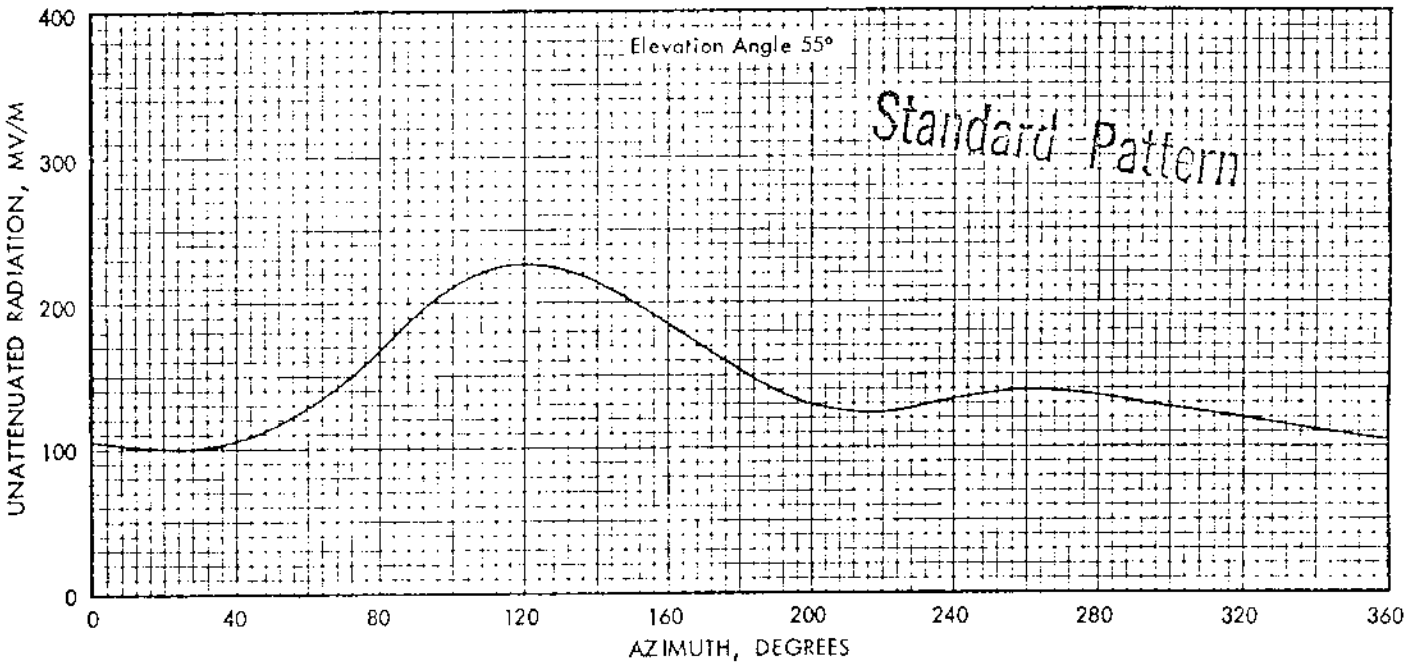
750909.2

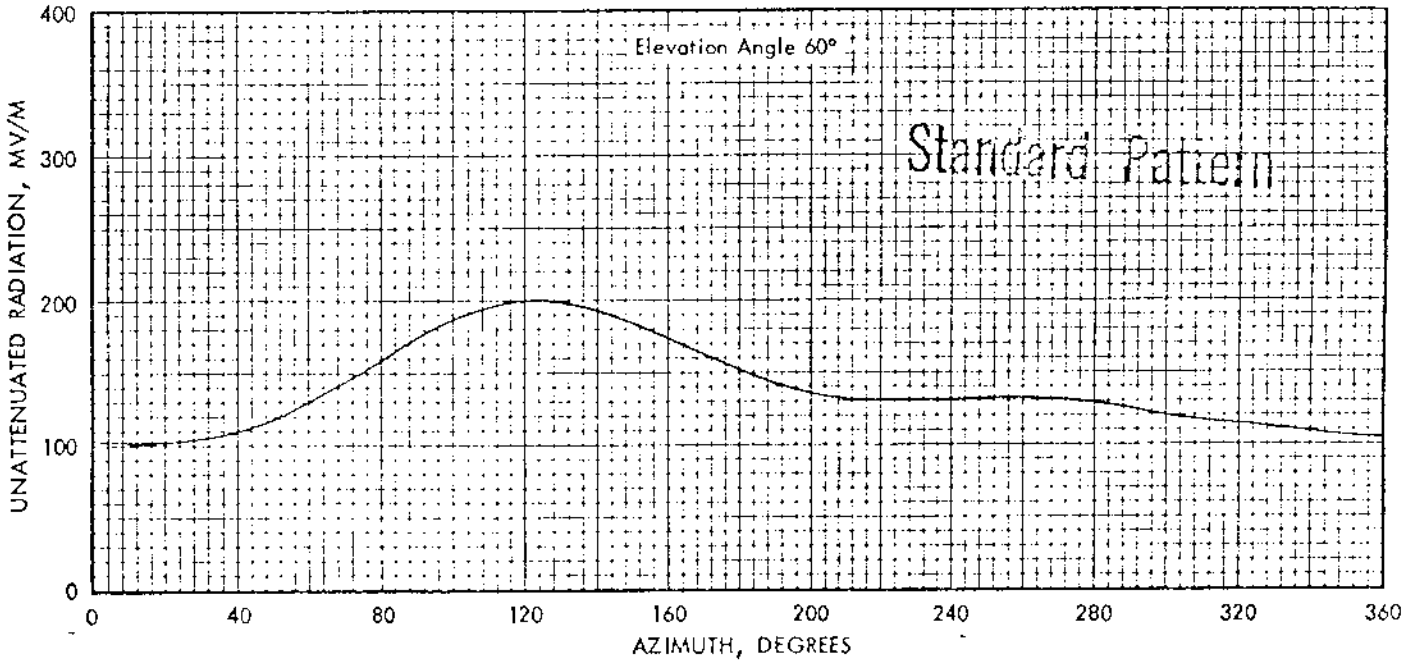
FIGURE 4G

KAKC

RADIO STATION KAKC

CALCULATED STANDARD RADIATION





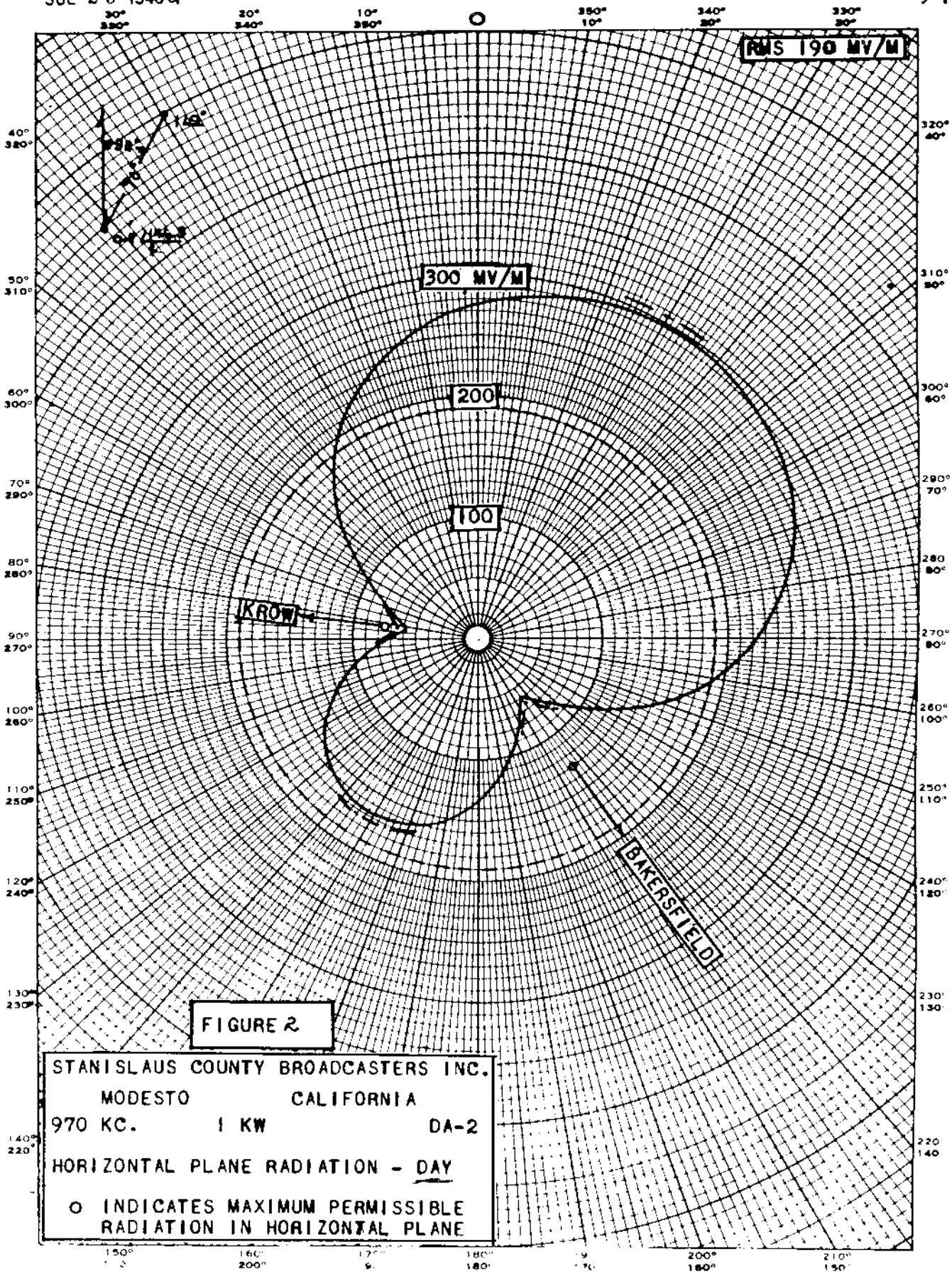
Hammett & Edison, Inc.
Consulting Engineers

750909.2

FIGURE 4H

KBEE ~~KBEK~~
MODESTO, CAL
970

JUL 23 1948 G



Amendment 7-16-48

BP-6713

~~KBOX~~
KBEE
970 KC

MEASURED
DAY

KBOX, MODESTO, CALIF.
11/26/51G

1 KW, U, DA-2

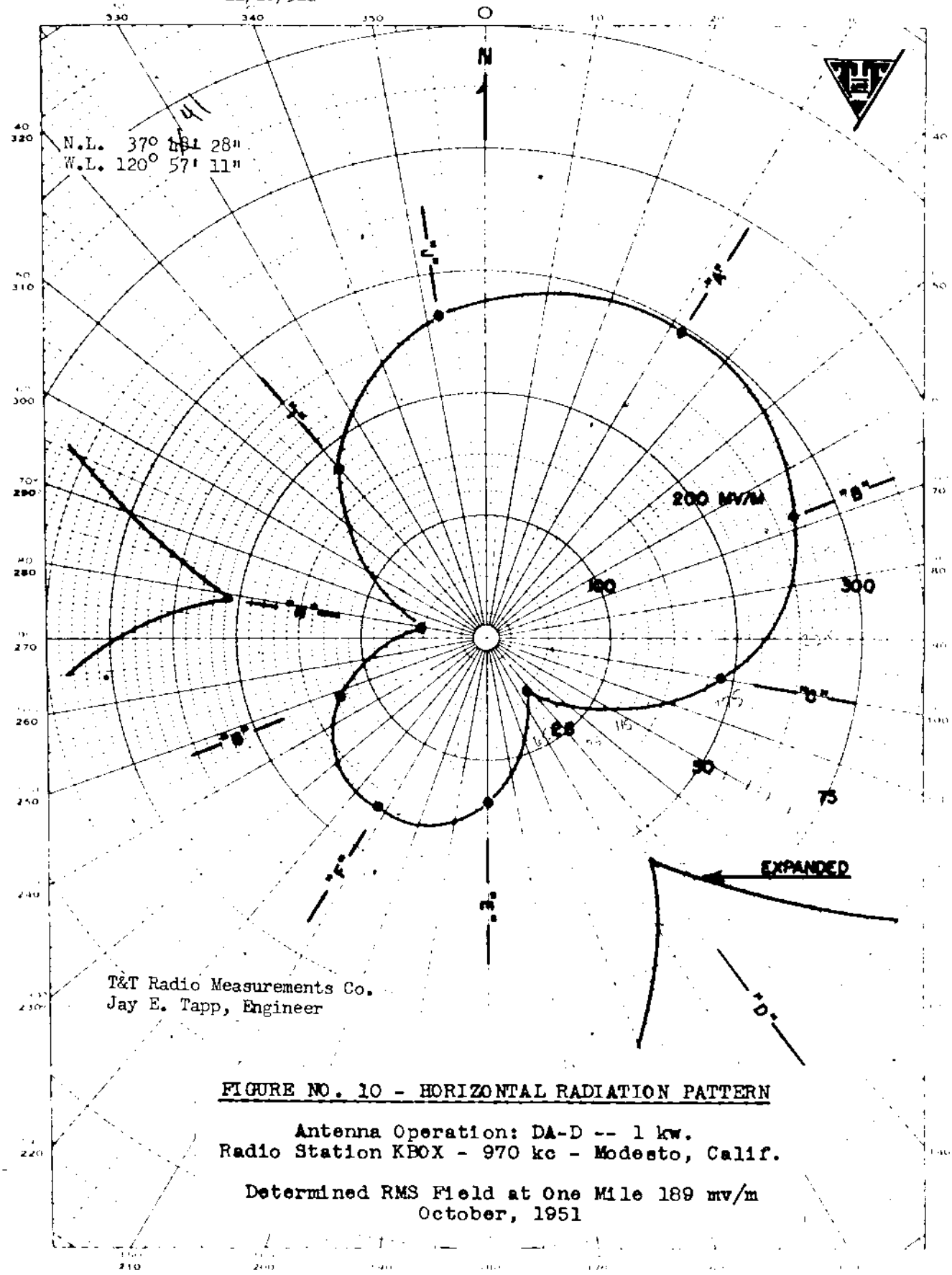


FIGURE NO. 10 - HORIZONTAL RADIATION PATTERN

Antenna Operation: DA-D -- 1 kw.
Radio Station KBOX - 970 kc - Modesto, Calif.

Determined RMS Field at One Mile 189 mv/m
October, 1951

APPL RECD 10/16/51 BL-4577

KBOX, MODESTO, CALIF. 970 KC

KBEX
MODESTO, CAL
970

JUL 23 1948 G

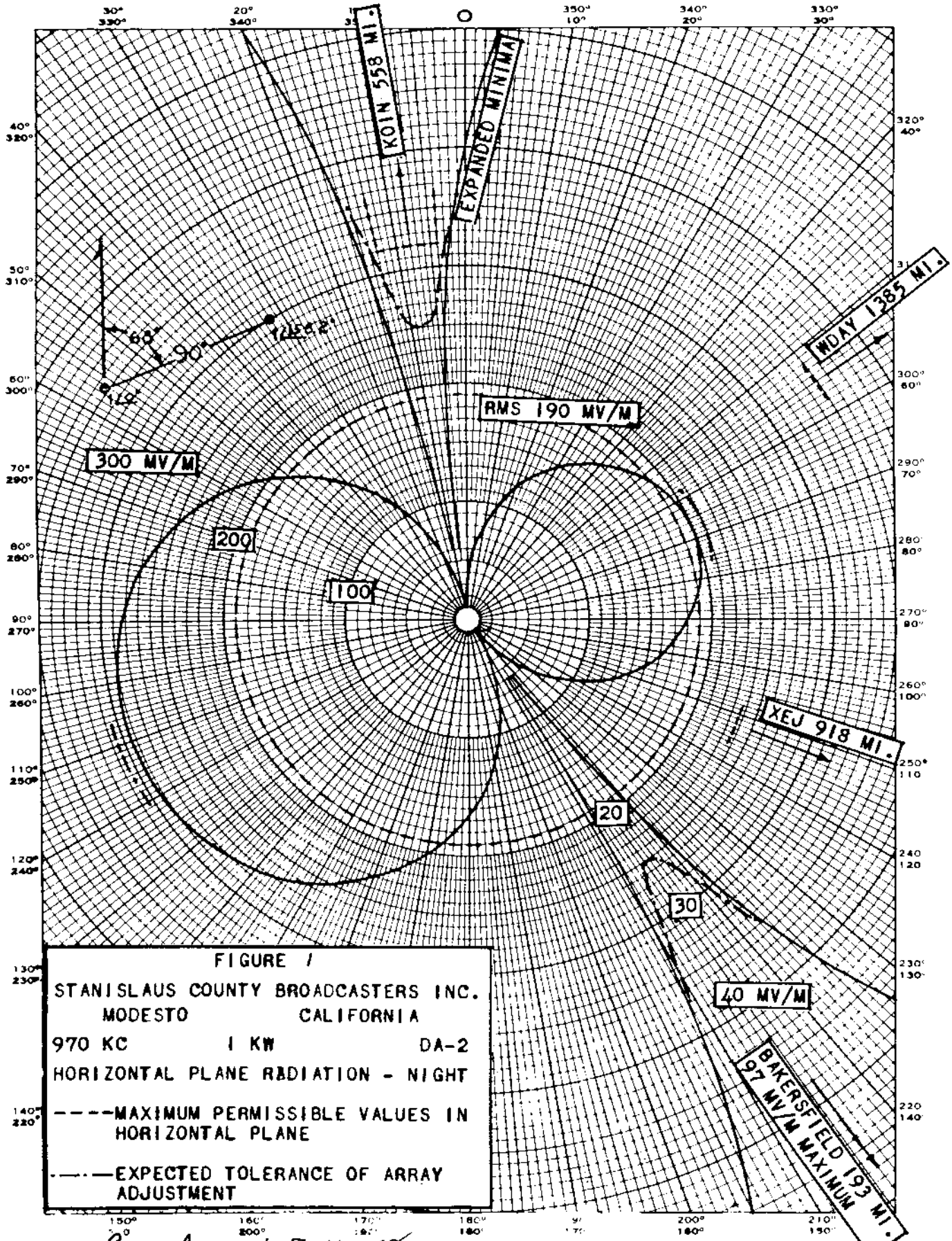


FIGURE 1

STANISLAUS COUNTY BROADCASTERS INC.
MODESTO CALIFORNIA

970 KC 1 KW DA-2

HORIZONTAL PLANE RADIATION - NIGHT

----MAXIMUM PERMISSIBLE VALUES IN HORIZONTAL PLANE

-·-·-EXPECTED TOLERANCE OF ARRAY ADJUSTMENT

NO. 340-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE

Amendment 7-16-48

BP-6713

~~KBOX~~ KBEE

MEASURED NIGHT | KBOX, MODESTO, CALIF. 11/26/51G | 1 KW, U, DA-2 | 970 KC

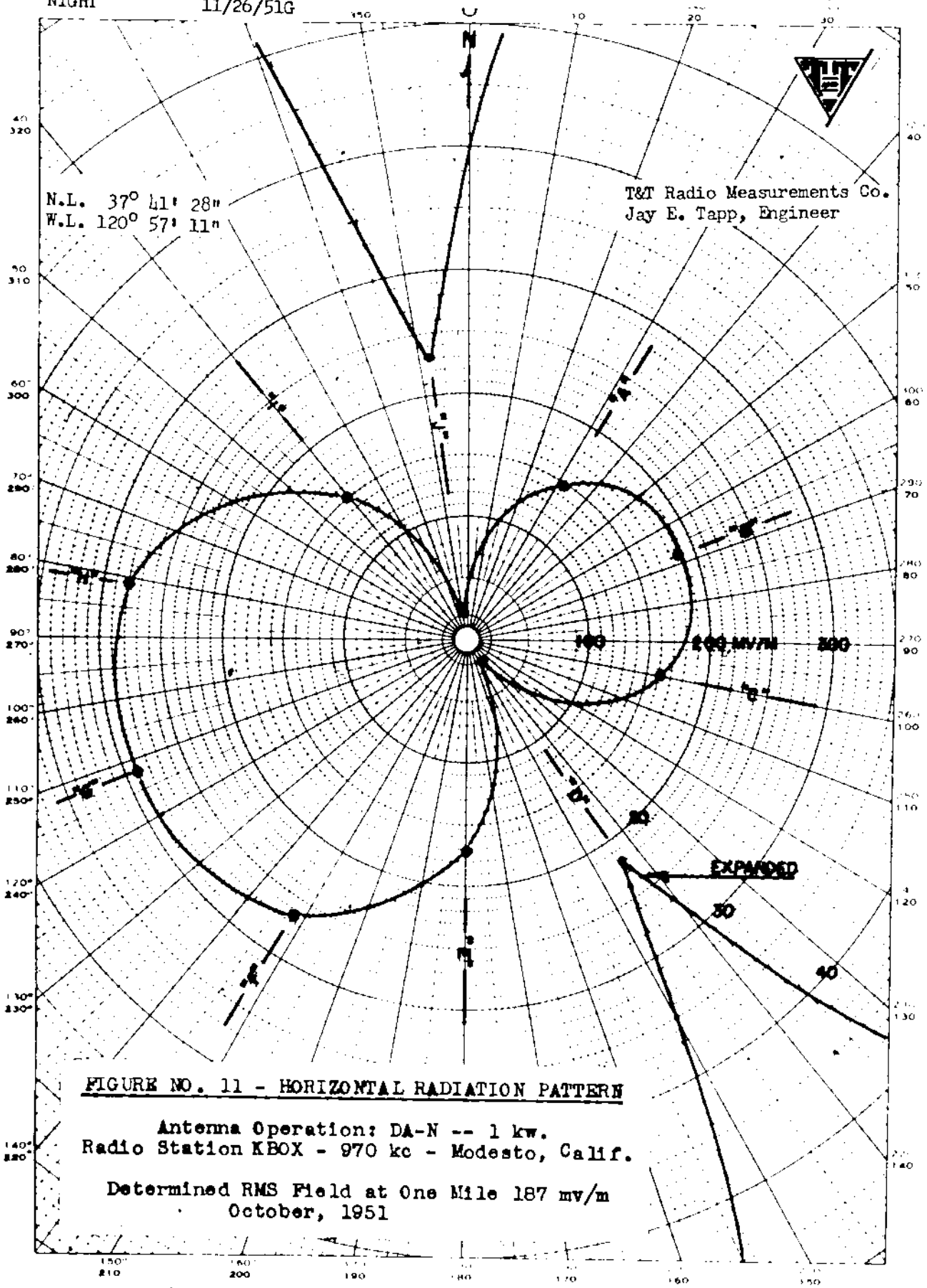


FIGURE NO. 11 - HORIZONTAL RADIATION PATTERN

Antenna Operation: DA-N -- 1 kw.
Radio Station KBOX - 970 kc - Modesto, Calif.

Determined RMS Field at One Mile 187 mv/m
October, 1951

APPL RECD 10/16/51 BL-4577 | KBOX, MODESTO, CALIF. | 970 KC

~~KBOX~~
KBEE
970 KC

MEASURED
NON-DA

KBOX, MODESTO, CALIF.
11/26/51G

1 KW, U, DA-2

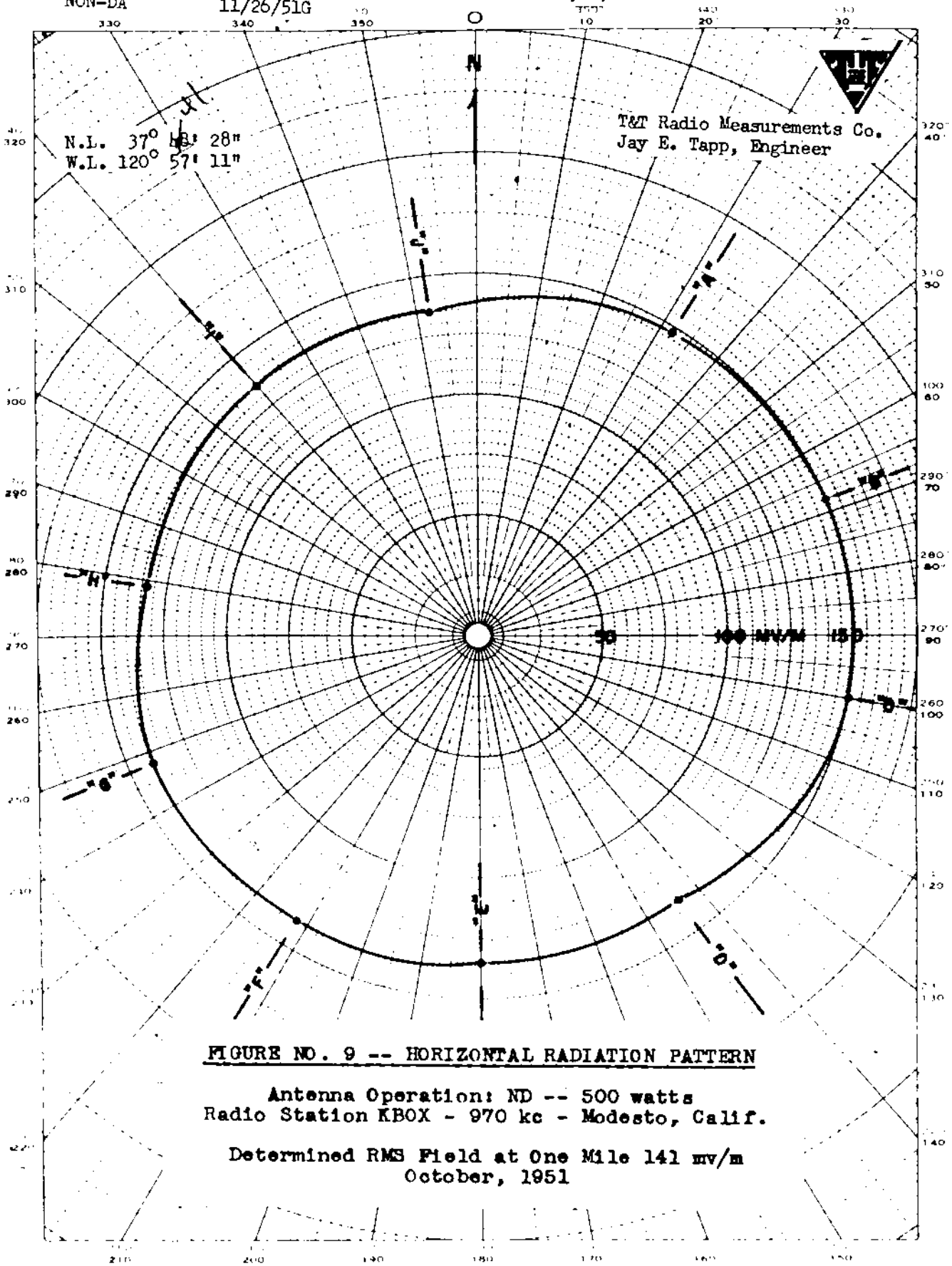


FIGURE NO. 9 -- HORIZONTAL RADIATION PATTERN

Antenna Operation: ND -- 500 watts
Radio Station KBOX - 970 kc - Modesto, Calif.

Determined RMS Field at One Mile 141 mv/m
October, 1951

KBIS

SUPPLEMENTAL DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KBIS

Main Studio: Bakersfield, California

Frequency: 970 kHz

Power: 1 kW

Notification List No. 1633

Date: May 20, 1975

Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM: North Latitude: 35° 25' 02"
West Longitude: 119° 00' 15"

Authorized for Daytime and Nighttime operation (DA-2).

Note: Please retain the description sheet and directional antenna radiation patterns notified for station KBIS in United States Change List Number 1518, dated March 2, 1973, and attach to this supplemental Description Sheet. This notification is for the purpose of indicating only a change in the geographical coordinates of the center of the antenna system.

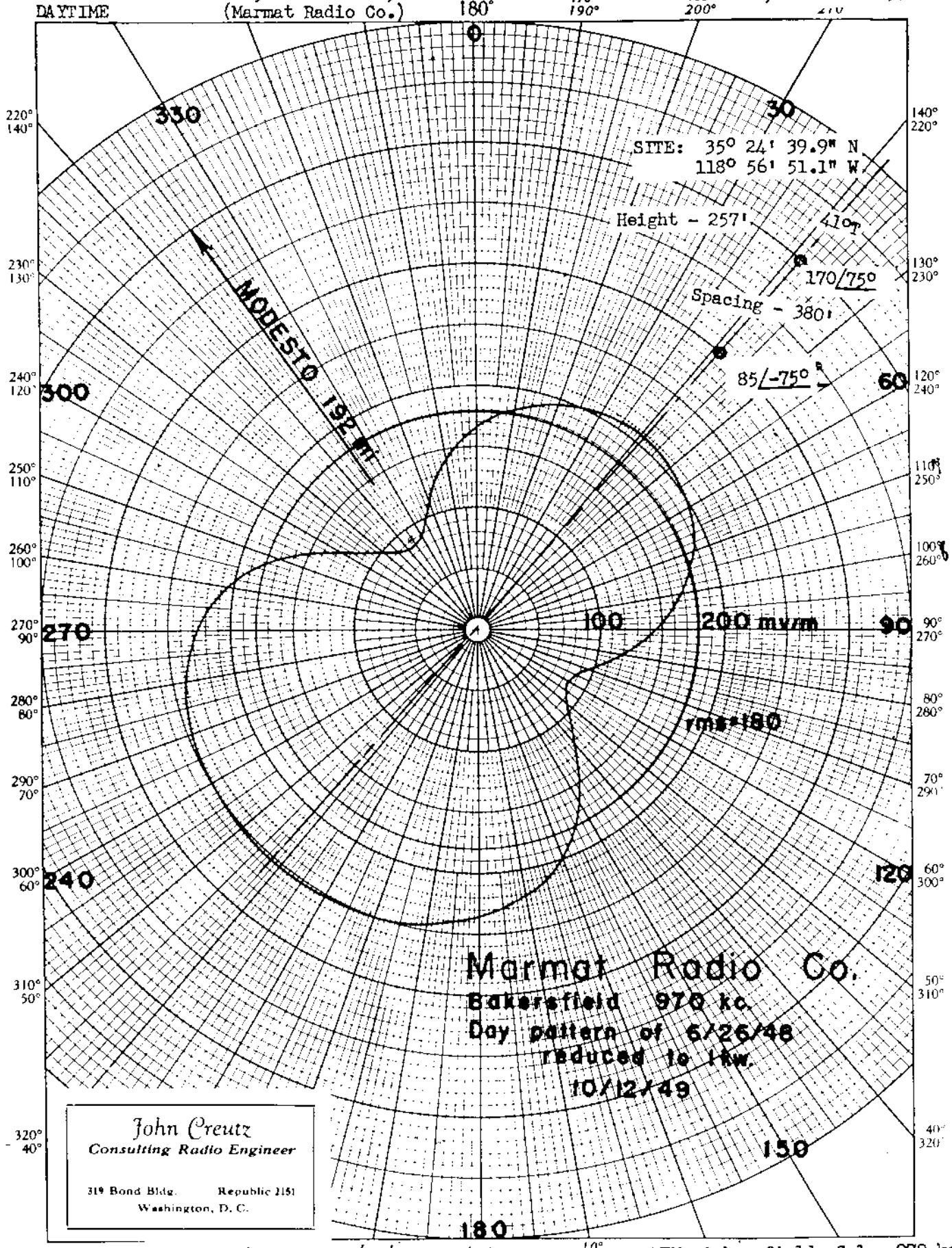
CTR NO 30813A6

KBIS

PROPOSED DAYTIME

NEW, BAKERSFIELD, CAL.
(Marmat Radio Co.)

1kw, DA-2 970 kc

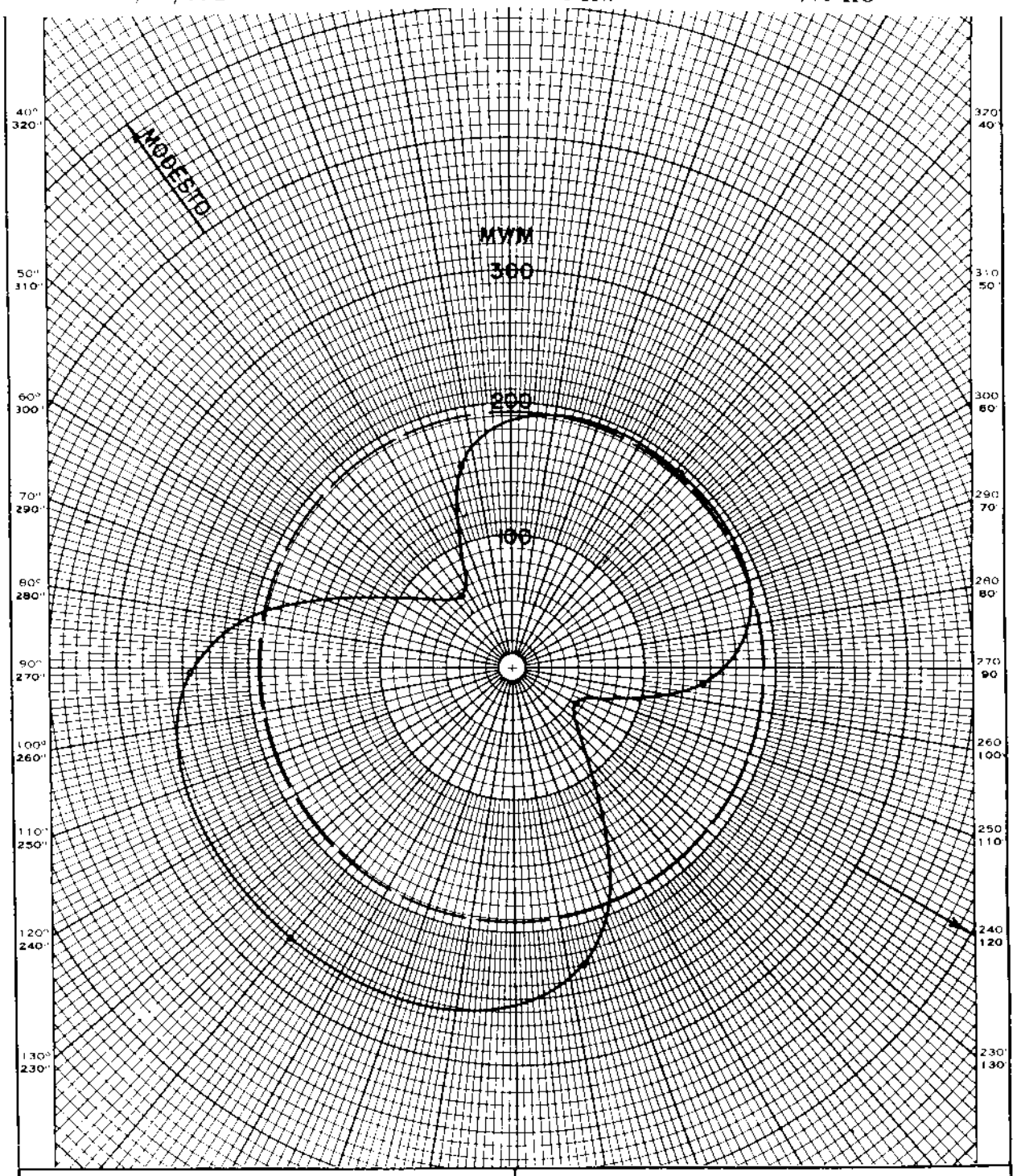


AMENDMENT FILED 3-8-50 ACC 3/17/50 BP-6184

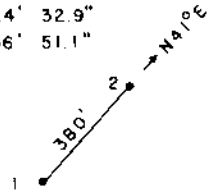
NEW, Bakersfield, Cal. 970 kc

KBIS

MEASURED DAY | KBIS, BAKERSFIELD, CALIF. 5/11/55G | U, DA-2 1 KW | 970 KC



N.LAT. 35° 24' 32.9"
W.LONG. 118° 56' 51.1"



RMS = 192 MV/M

ROBERT L. HAMMETT
CONSULTING RADIO ENGINEER
SAN FRANCISCO

RADIO STATION KBIS
970 KC, 1 KW, DA-2
BAKERSFIELD, CALIFORNIA

HORIZONTAL RADIATION PATTERN DAYTIME

MEASURED UNATTENUATED FIELD INTENSITY AT ONE MILE

550420

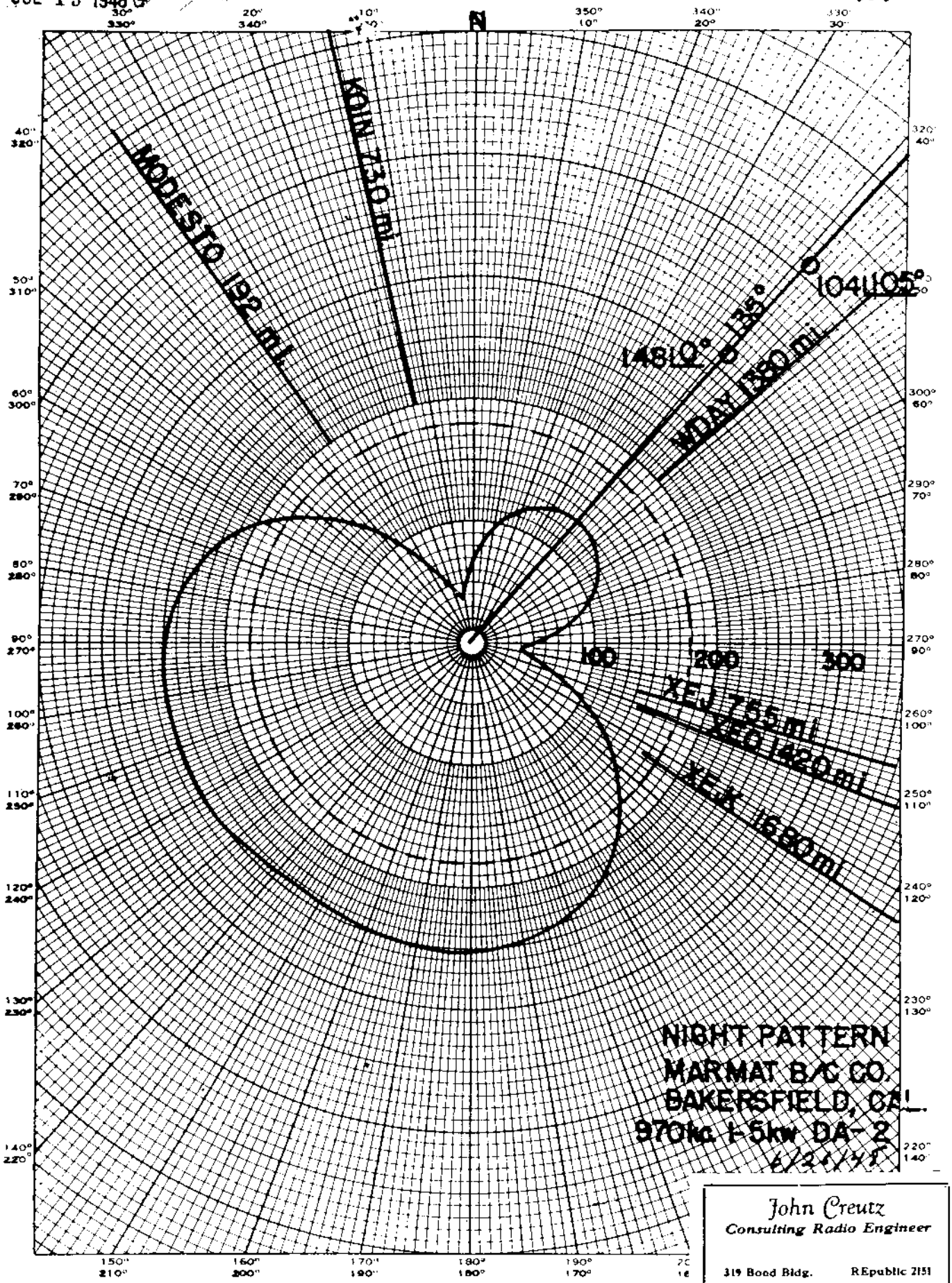
FIGURE 7C

FCC File No. BZ-3597 Accepted 5-6-55
(Amended)

KBIS, BAKERSFIELD, CALIF. 970 KC

KBIS
BAKERSFIELD, CAL.
970

JUL 13 1948



John Creutz
Consulting Radio Engineer

319 Bond Bldg. REpublic 2151
Washington, D. C.

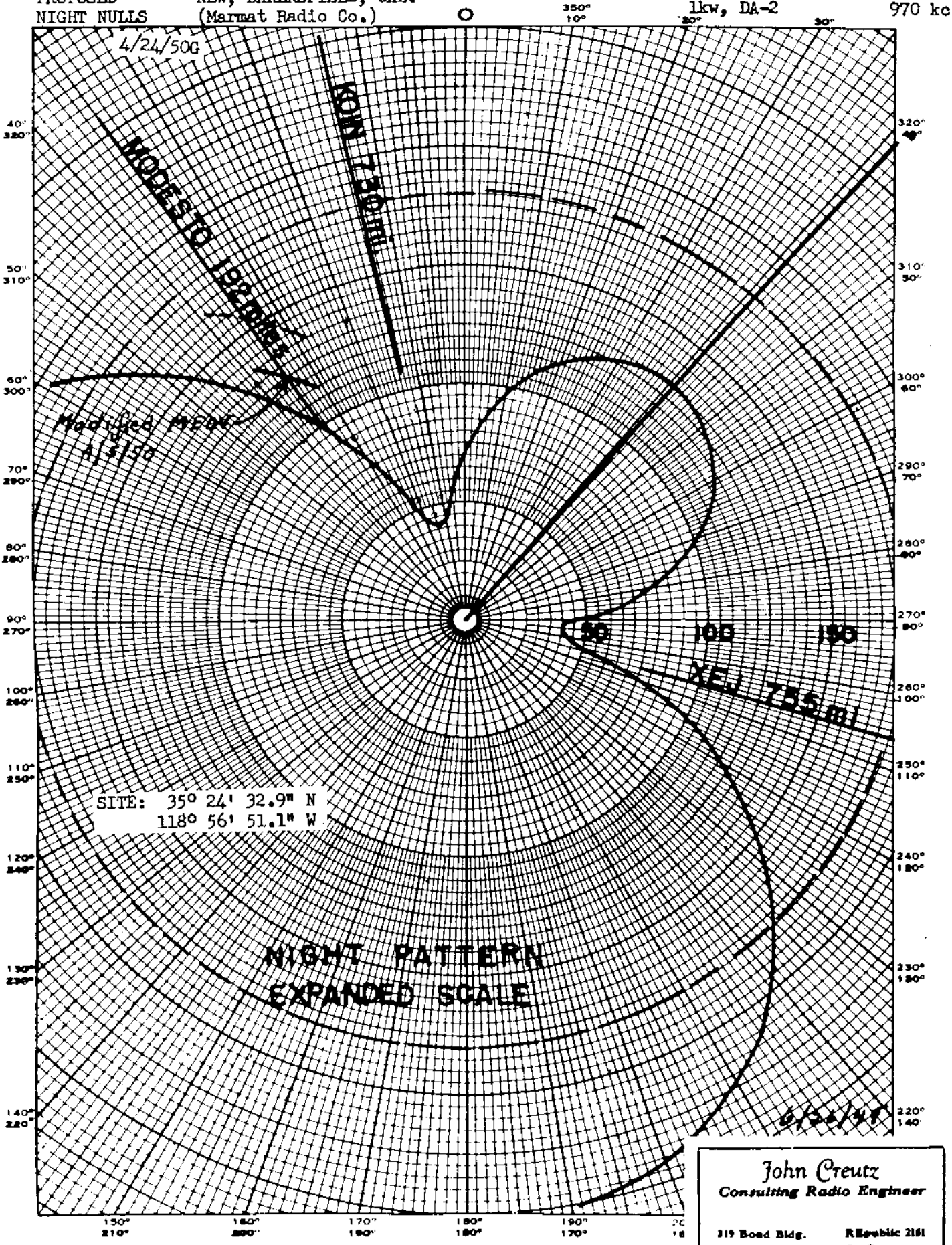
KB15
BAKERSFIELD

PROPOSED NIGHT NULLS

NEW, BAKERSFIELD, CAL.
(Marmat Radio Co.)

1kw, DA-2

970 kc



John Creutz
Consulting Radio Engineer
319 Bond Bldg. REpublic 2181
Washington, D. C.

AMENDMENT RECD 4-11-50 BP-6184

NEW, Bakersfield, Cal. 970 kc

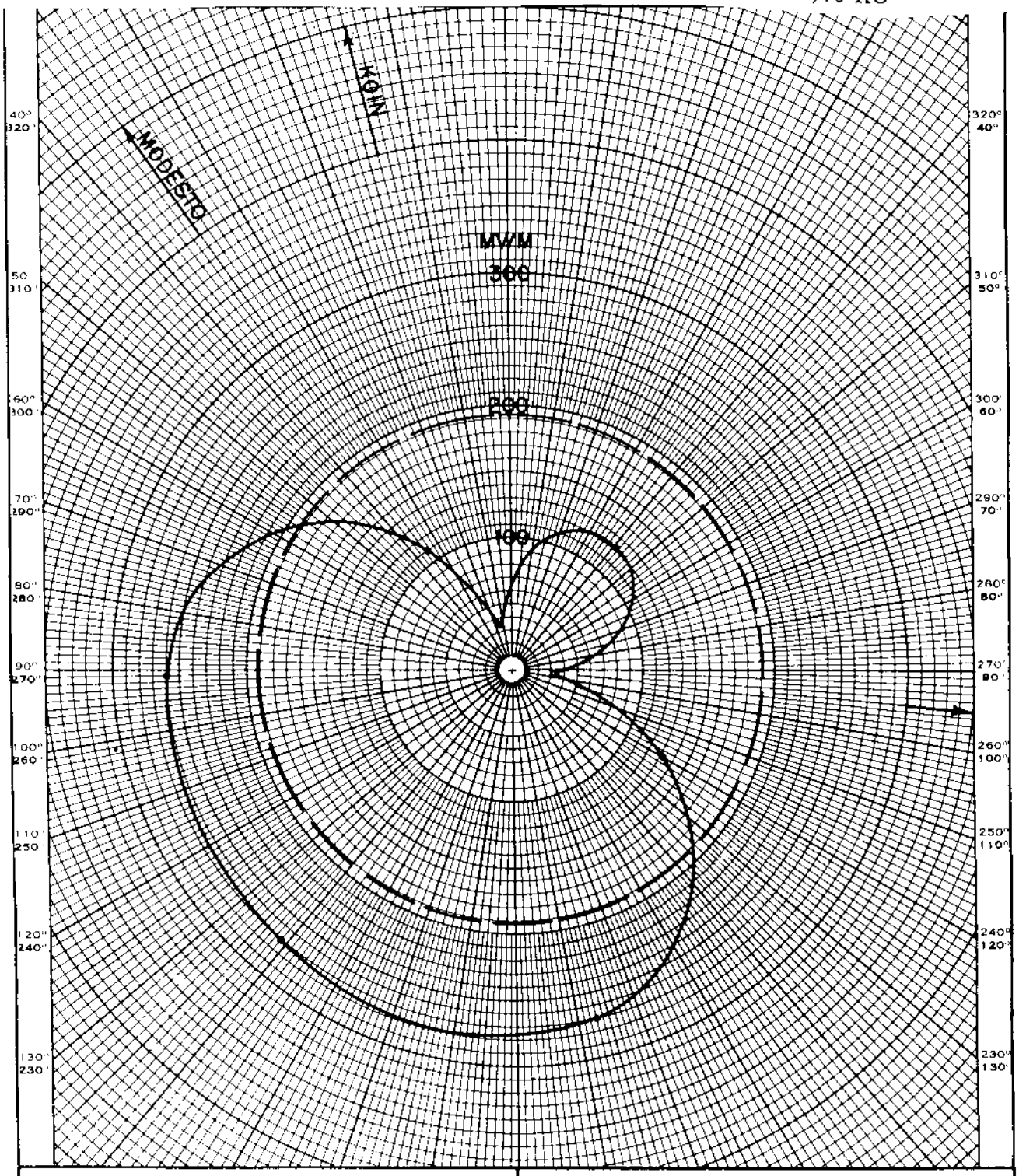
KBIS

MEASURED NIGHT

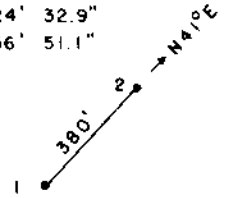
KBIS, BAKERSFIELD, CALIF.
5/11/55G

U. DA-2
1 KW

970 KC



N.LAT. 35° 24' 32.9"
W.LONG.118° 56' 51.1"



RMS = 192 MV/M

ROBERT L. HAMMETT
CONSULTING RADIO ENGINEER
SAN FRANCISCO

RADIO STATION KBIS
970 KC, 1 KW, DA-2
BAKERSFIELD, CALIFORNIA

HORIZONTAL RADIATION PATTERN NIGHTTIME

MEASURED UNATTENUATED
FIELD INTENSITY AT ONE MILE

550420

FIGURE 2B

FCC No. BZ-3597 (Amended) Accepted 5-6-55

KBIS, BAKERSFIELD, CALIF.

970 KC

KCHV

Measured Non-DA
(3-30-64ct)

Station KCHV
Coachella, California

1kw,5kw-LS,DA-2,U
970kc

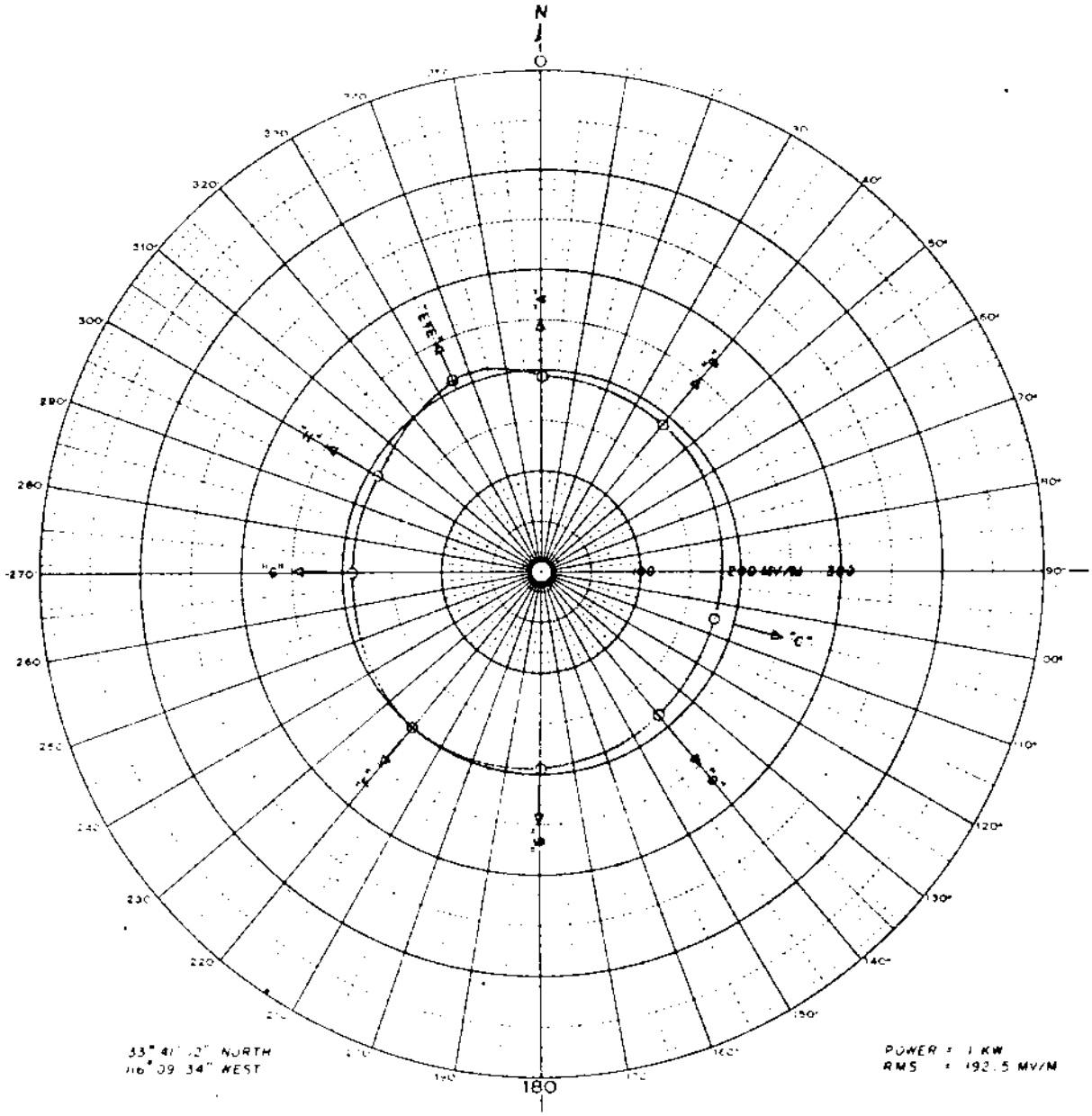


FIGURE NO. 12

NON-DIRECTIONAL ANTENNA RADIATION PATTERN

BASED ON FIELD INTENSITY MEASUREMENTS

970 KC/S ● 5/1 KW ● DA-2

STATION KCHV — COACHELLA, CALIFORNIA

NOVEMBER 1963

FCC File No. BL-10406
Accepted 3-4-64

Station KCHV
Coachella, California

970kc

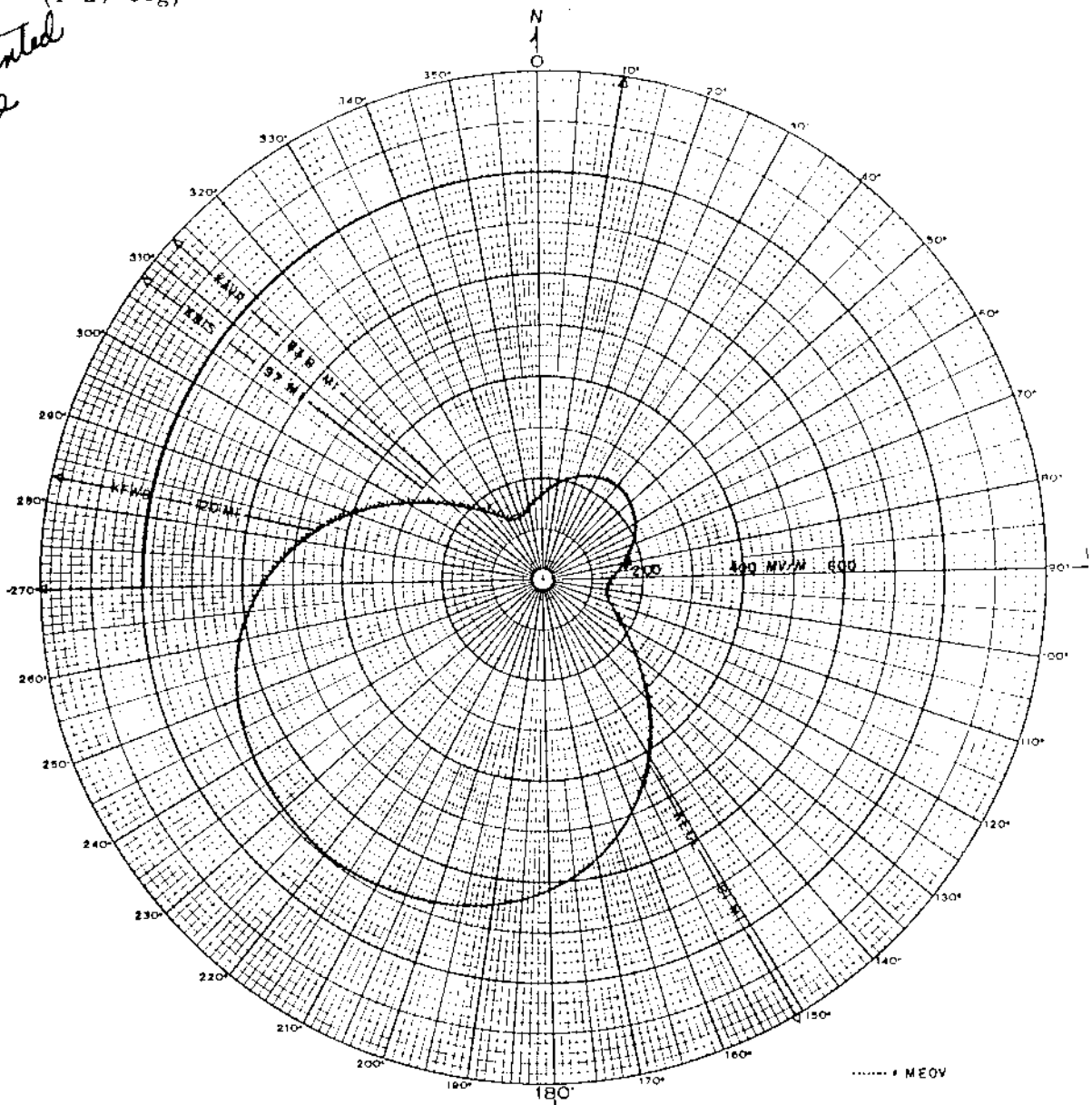
KCHV

PROPOSED DAY
(1-29-60g)

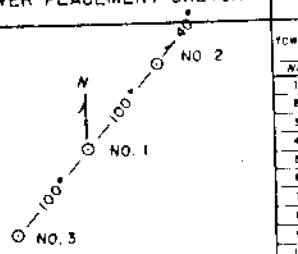
3-2-62 granted
Cp for DA-2

Station KCHV
Coachella, California

1kw,5kw-LS,DA-2,U
970 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA
	TOWER No.	ELECTRICAL HEIGHT d°	TRUE TOWER ORIENTATION f°	SPACING s°	PHASING v°	HORIZONTAL FIELD mv/m e	FIELD RATIO r	ELEV. ANGLE θ°	ELEVATION RMS FIELD mv/m Ex	CALL KCHV
	1	90	0	0	0	433	1.0	0	422	FREQUENCY 970 kc
	2	90	40	100	130		0.35	10		POWER 5.0 kw
	3	90	220	100	-130		0.33	20		TIME OF OPERATION DAY
	4							30		TYPE OF OPERATION DA-2
	5							40		DAYTIME TOWERS 3
	6							50		NIGHTTIME TOWERS 3
	7							60		NO RADIALS PER TOWER 120
	8							70		LENGTH OF RADIALS 106' 300 ft
	9							80		GROUND SCREEN DIMENSION
	10									LAT 33° 41' 12"
										LONG 116° 09' 34"
										SUPERSEDES
										PATTERN No.



DAYTIME OPERATION ☒ NIGHTTIME OPERATION ☐

EXHIBIT NO. 1

RADIO STATION KCHV
970 KC —— 5 KW —— DA-2
COACHELLA, CALIFORNIA

JULY —— 1959

FCC File No. BP-13740
Accepted 1-13-60

KCHV
Coachella, California

970 KC

15

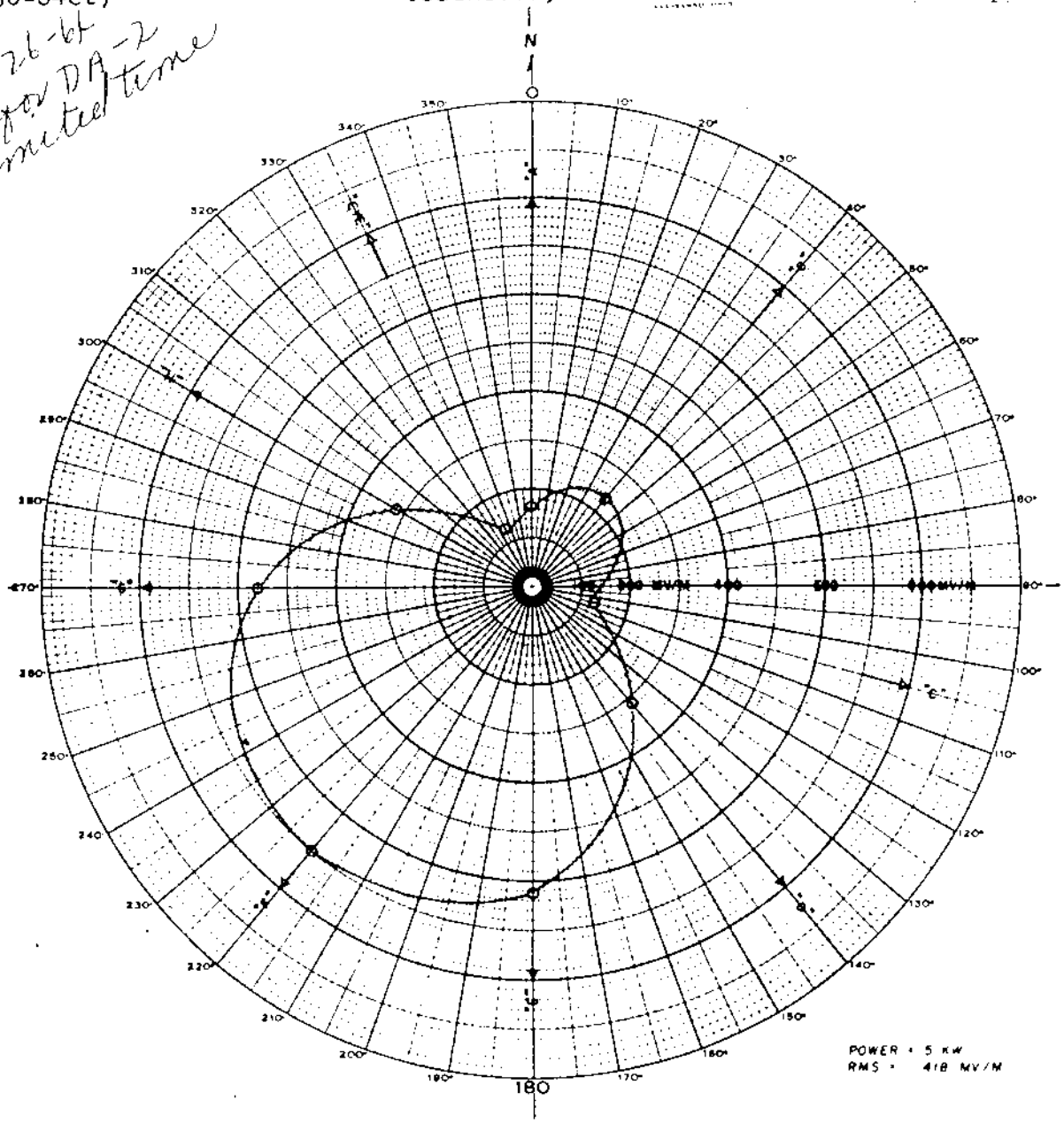
KCHV

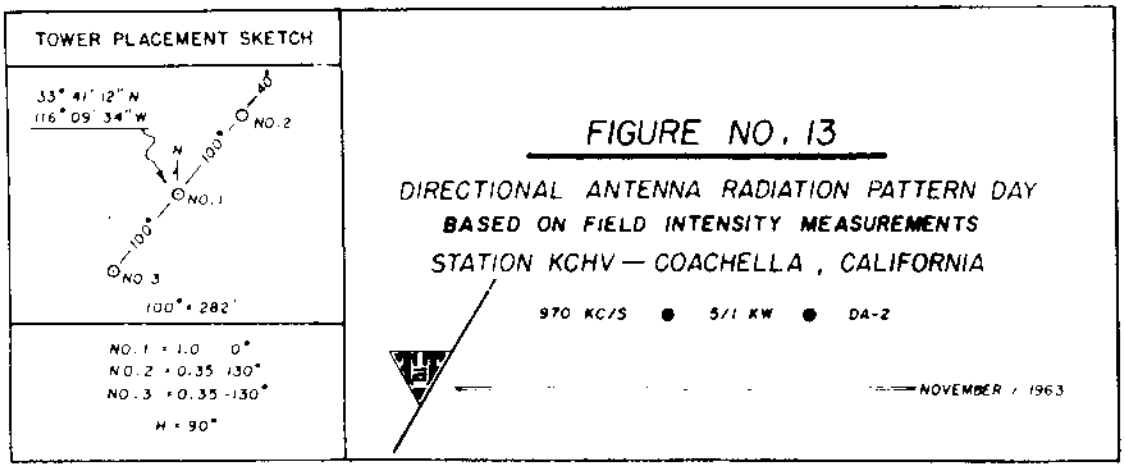
Measured Day
(3-30-64ct)

#201-8-26-64 granted for DA-2 and unlimited time

Station KCHV
Coachella, California

1kw,5kw-LS,DA-2,U
970kc





FCC File No. BL-10406
Accepted 3-4-64

Station KCHV
Coachella, California

970kc

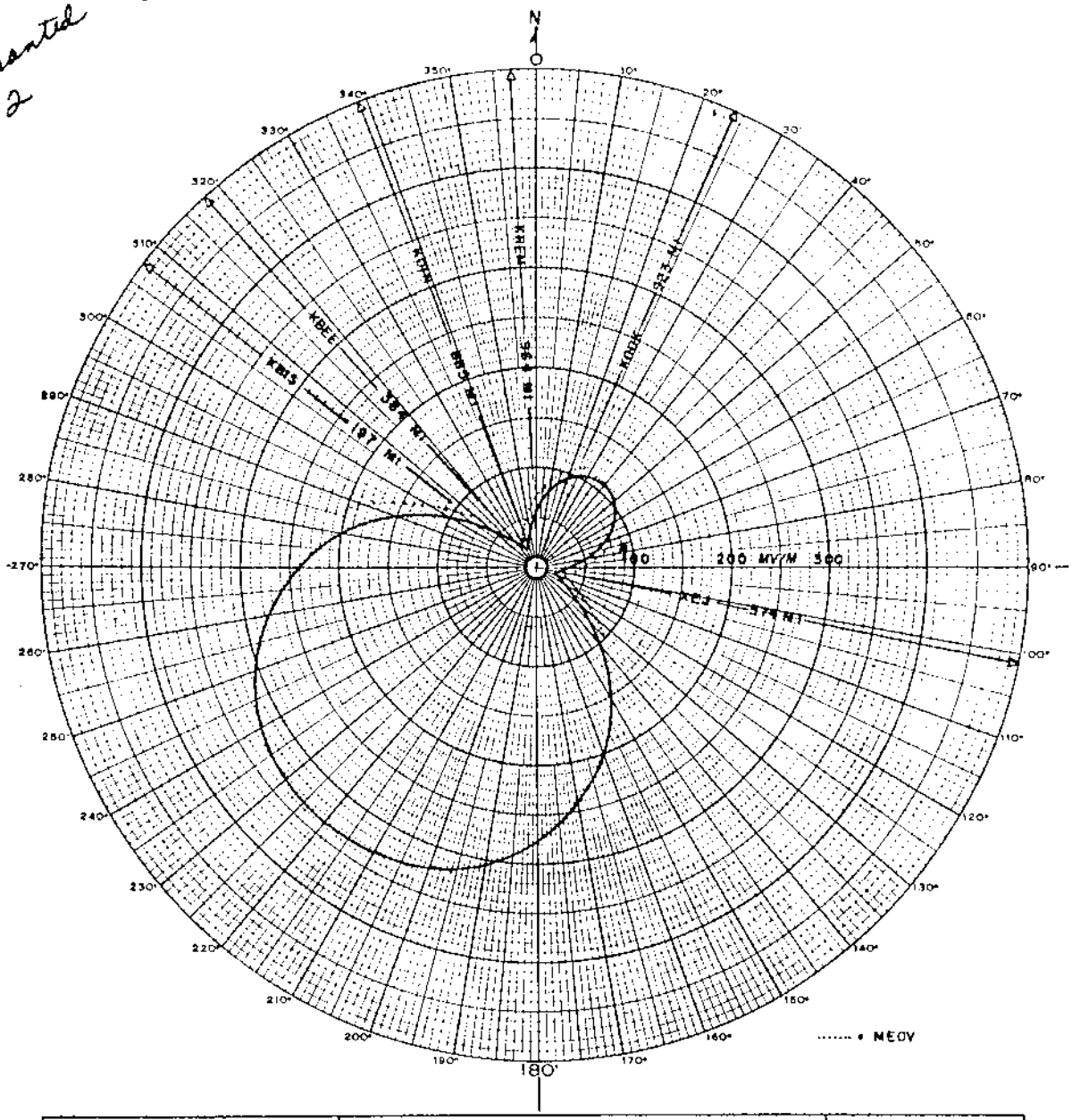
KCHV

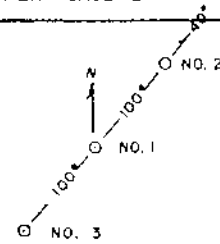
PROPOSED NIGHT
(1-29-60g)

Station KCHV
Coachella, California

1kw,5kw-LS, DA-2,U
970 KC

3-2-62 granted
CP for DA-2



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA	
	TOWER No	ELECTRICAL HEIGHT θ°	TRUE TOWER ORIENTATION φ°	SPACING s°	PHASING ψ°	HORIZONTAL FIELD mv/m E	FIELD RATIO r	ELEV ANGLE θ°	ELEVATION RMS FIELD mv/m E_θ	CALL	KCHV
	1	90	0	0	0	198	1.0	0	186.3	FREQUENCY	970 kc
	2	90	40	100	140		0.45	10		POWER	1.0 kw
	3	90	220	100	-140		0.45	20		TIME OF OPERATION	NIGHT
	4							30		TYPE OF OPERATION	DA-2
	5							40		DAYTIME TOWERS	3
	6							50		NIGHTTIME TOWERS	3
	7							60		No RADIALS PER TOWER	120
	8							70		LENGTH OF RADIALS	106' 300'
	9							80		GROUND SCREEN DIMENSION	
	10							E_θ	mv/m	LAT.	33 41 12
	DAYTIME OPERATION [ ]			NIGHTTIME OPERATION [X]				E_θ	mv/m	LONG	116 09 34
										SUPERSEDES	
										PATTERN No.	

NO. 1 — NO. 2 — NO. 3 — N — 100 — 100 — 40°

EXHIBIT NO. 1-A

RADIO STATION KCHV
970 KC —— 1 KW —— DA-2
COACHELLA, CALIFORNIA

JULY 1959

FCC File No. BP-13740
Accepted 1-13-60

KCHV
Coachella, California

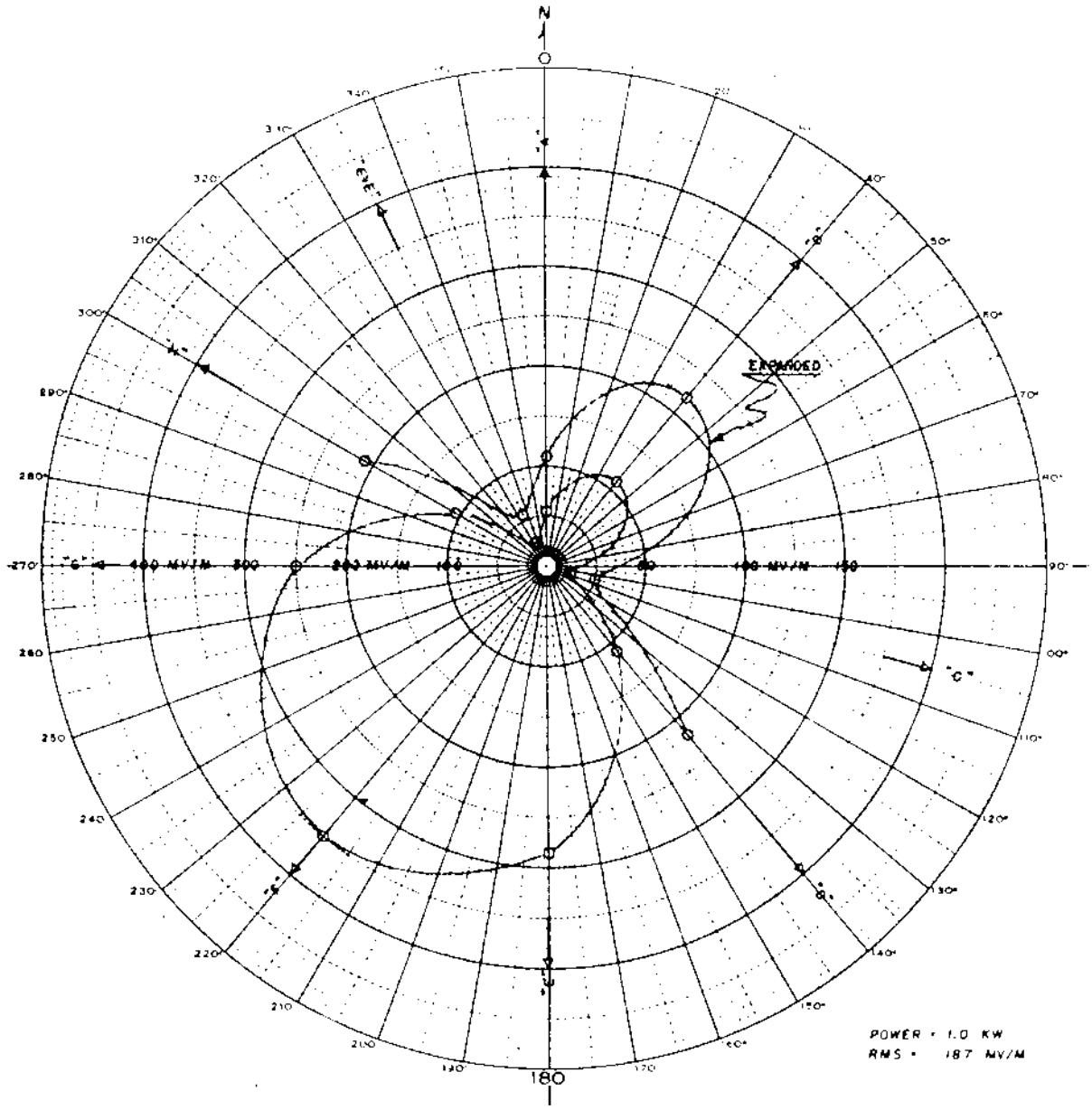
970 KC

KCHV

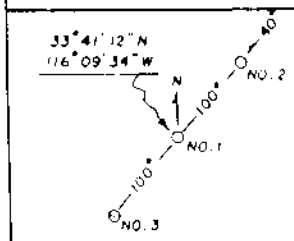
Measured Night
(3-30-64ct)

Station KCHV
Coachella, California

1kw,5kw-LS,DA-2,U
970kc



TOWER PLACEMENT SKETCH



NO.1 = 1.0 0°
NO.2 = 0.45 140°
NO.3 = 0.45 -140°
H = 90°

FIGURE NO. 14

DIRECTIONAL ANTENNA RADIATION PATTERN NIGHT
BASED ON FIELD INTENSITY MEASUREMENTS
STATION KCHV — COACHELLA, CALIFORNIA

970 KC/S ● 5/1 KW ● DA-2

NOVEMBER 1, 1963

FCC File No. BL-10406
Accepted 3-4-64

Station KCHV
Coachella, California

970kc

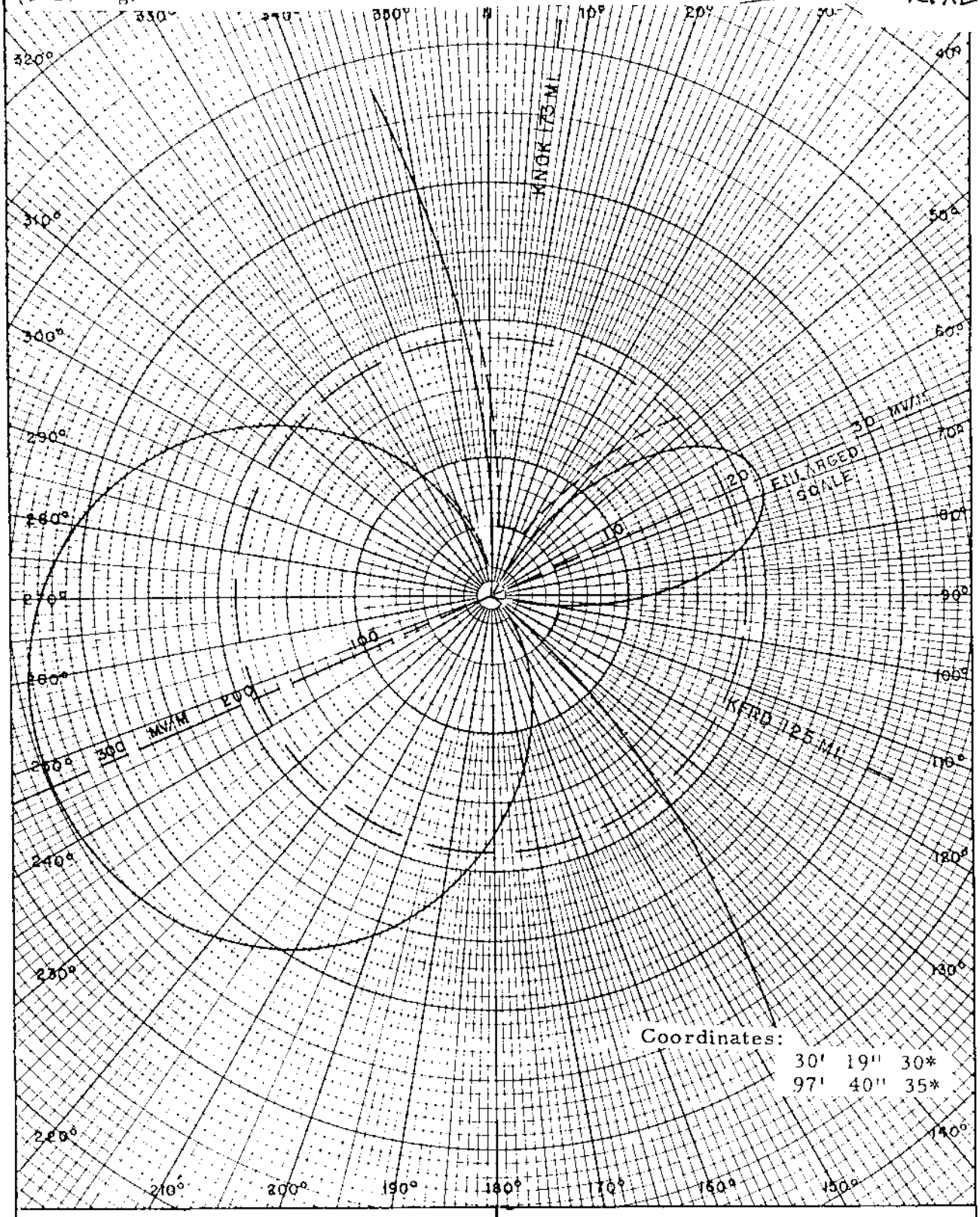
AUSTIN, TEX

PROPOSED DAY (1-29-57g)

Austin Radio Company 1 KW, DA-D, D
Austin, Texas

970 K C

KIXL



S = 75° = 211.4'

---- MEOV

1∠-132° (1) ←S→ 1.97∠0° (2) ←S→ 1∠132° (3) → N 67° E

R.M.S. = 187 MV/M

G'S = 85° = 240'

J. G. ROUNTREE
CONSULTING RADIO ENGINEER
5622 DYER STREET
DALLAS 6, TEXAS

AUSTIN RADIO COMPANY
AUSTIN, TEXAS
PROPOSED 970 KC, 1000 W, DA-D

561027

FIGURE 2A

FCC File No. BP-~~9661~~ 11,247

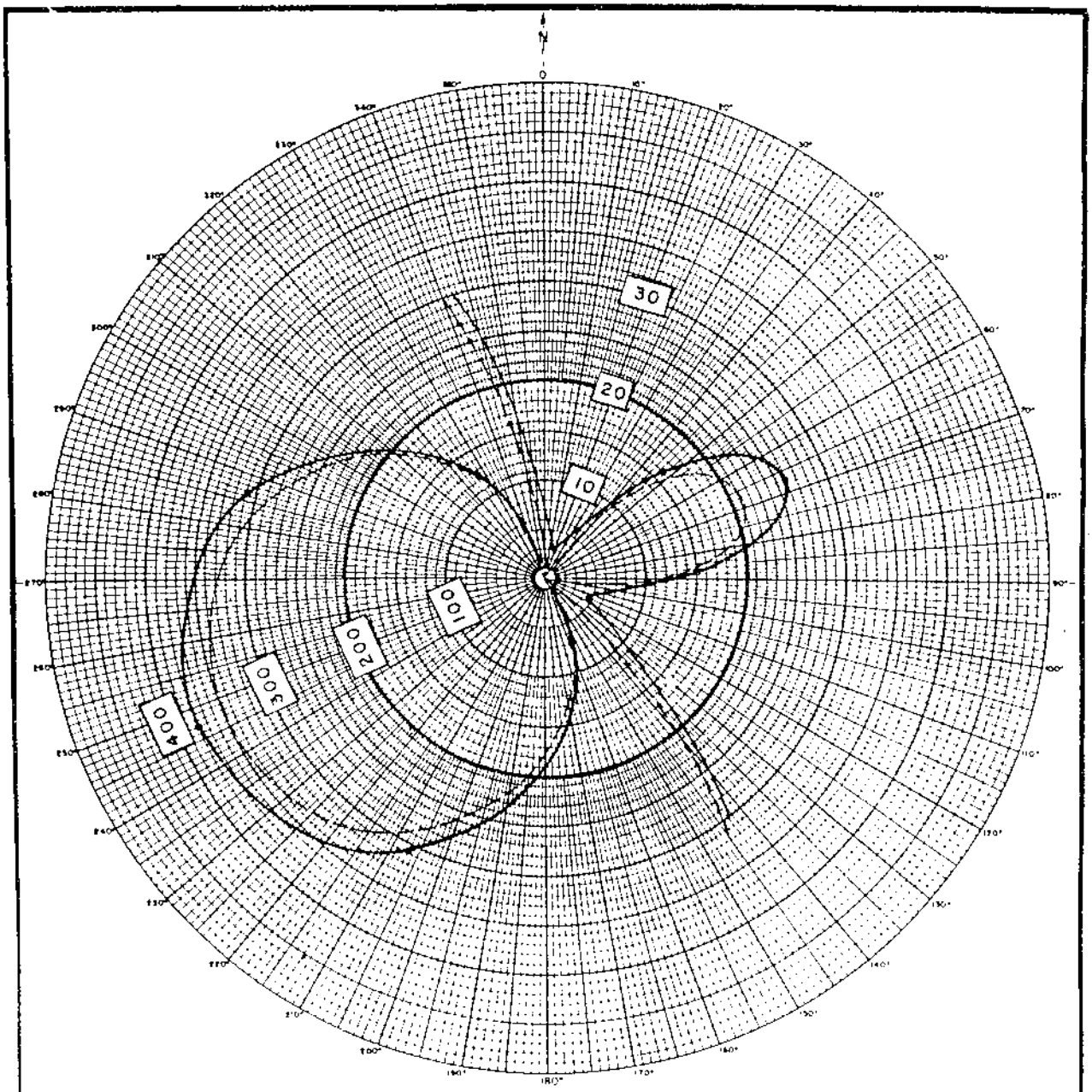
Accepted 1-9-57

Austin Radio Co.
Austin, Texas

970 K C

vented CP 1/24/58 for new station

KIXL



E_{RMS} = 202 MV/M (MEASURED)

• RADIAL VALUES
---- THEORETICAL PATTERN
—— MEASURED PATTERN

LATITUDE 30° 19' 51"
LONGITUDE 97° 36' 54"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS

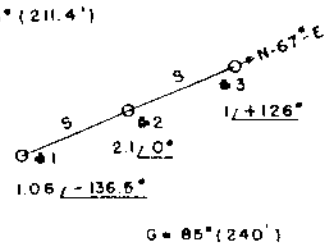


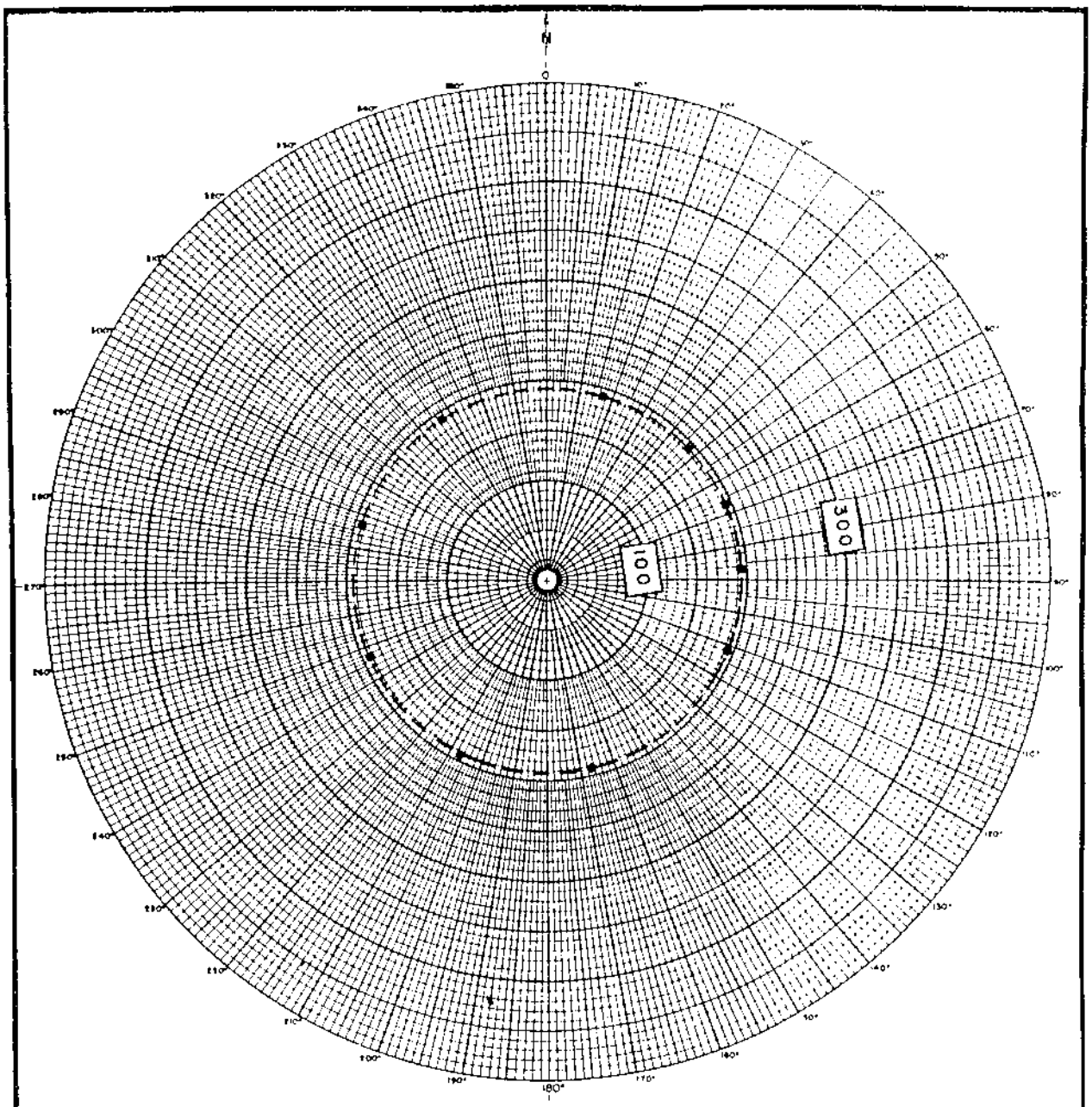
FIGURE 19

PLOT OF MEASURED DAYTIME HORIZONTAL PATTERN

RADIO STATION KASE
AUSTIN, TEXAS

970 KC | 1 KW, DA-D

Provided [illegible] station T-1-6



E_{RMS} = 193 MV/M (MEASURED)

• RADIAL VALUES

LATITUDE 30° 19' 51"
LONGITUDE 97° 36' 54"

ANTENNA PARAMETERS

G = 85°

FIGURE 17

PLOT OF MEASURED NON-DIRECTIONAL PATTERN

RADIO STATION KASE
AUSTIN, TEXAS

970 KC

1 KW, DA-D

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

Provided [illegible] station [illegible]

KNUU
970 KHZ

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KNUU

Main Studio: Paradise, Nevada

Frequency: 970 kHz

Power: 0.5kw Night 5kw Day

Notification List No. 1788

Date: August 22, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 36° 04' 23"
West Longitude: 115° 15' 05"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 5
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	#1	#2	#3	#4	#5
HEIGHT ABOVE INSULATORS:	230'	230'	230'	230'	230' (81.65°)
NIGHT PHASING:	0°	-114.9°	-138.8°	+101.4°	---
NIGHT FIELD RATIO:	1.0	0.552	0.636	0.351	---
DAY PHASING:	---	---	+81.6°	-109.7°	0°
DAY FIELD RATIO:	---	---	0.533	0.533	1.0

SPACING AND NIGHT ORIENTATION:

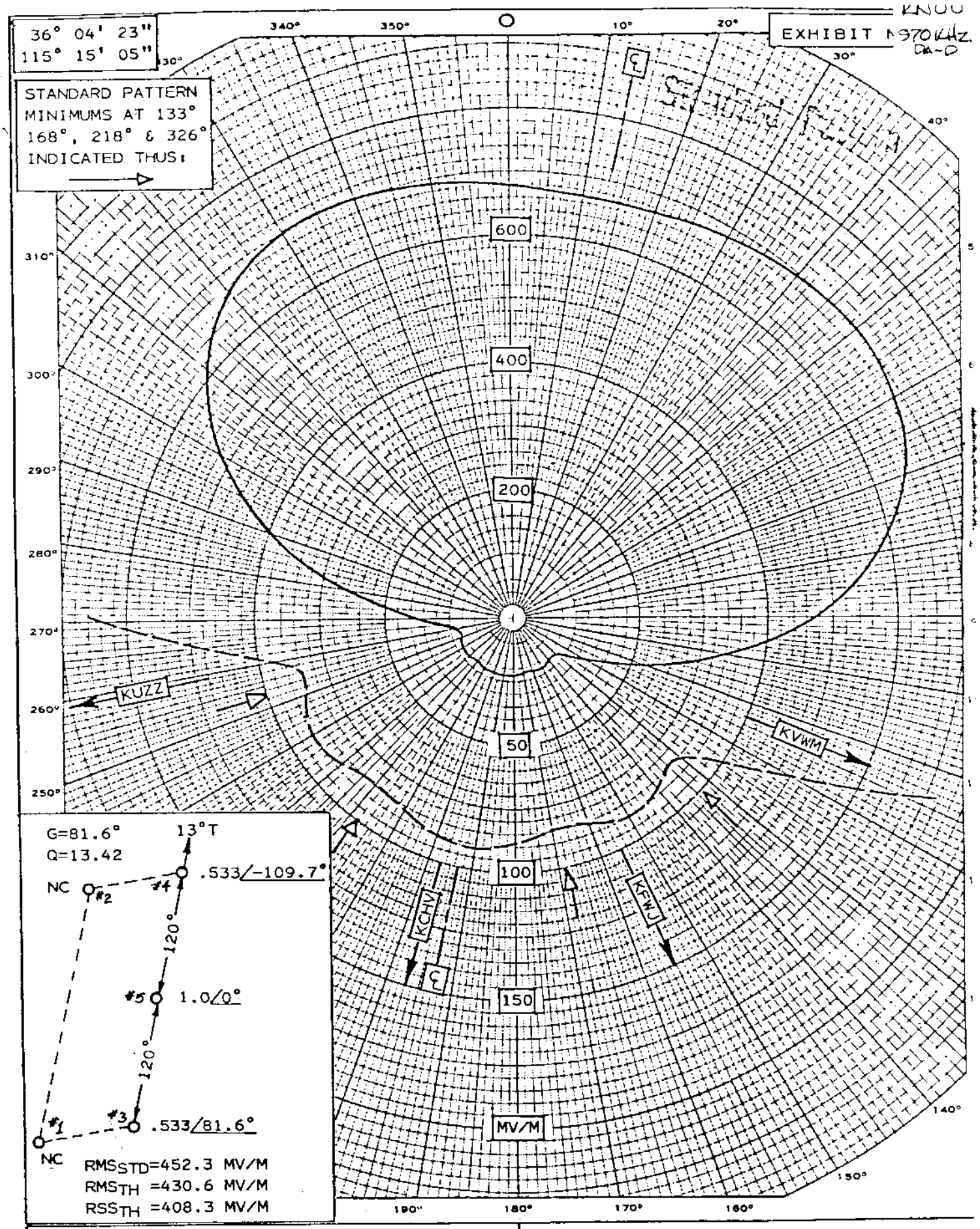
NIGHT:
The towers are located at the vertices of a parallelogram the long sides of which are 120° in length on a line bearing 13° true. The short sides are 90° in length on a line bearing 80° true.
DAY: Adjacent towers in a row are spaced 120° on a line bearing 13° true.

GROUND SYSTEM:

120 - 250' equally spaced copper radials plus a 48' square ground screen about each tower. Radials are shortened and bonded to transverse straps along intersections between towers.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	430.6 mv/m	408.3 mv/m	452.3 mv/m
Night	136.5 mv/m	164.1 mv/m	143.5 mv/m

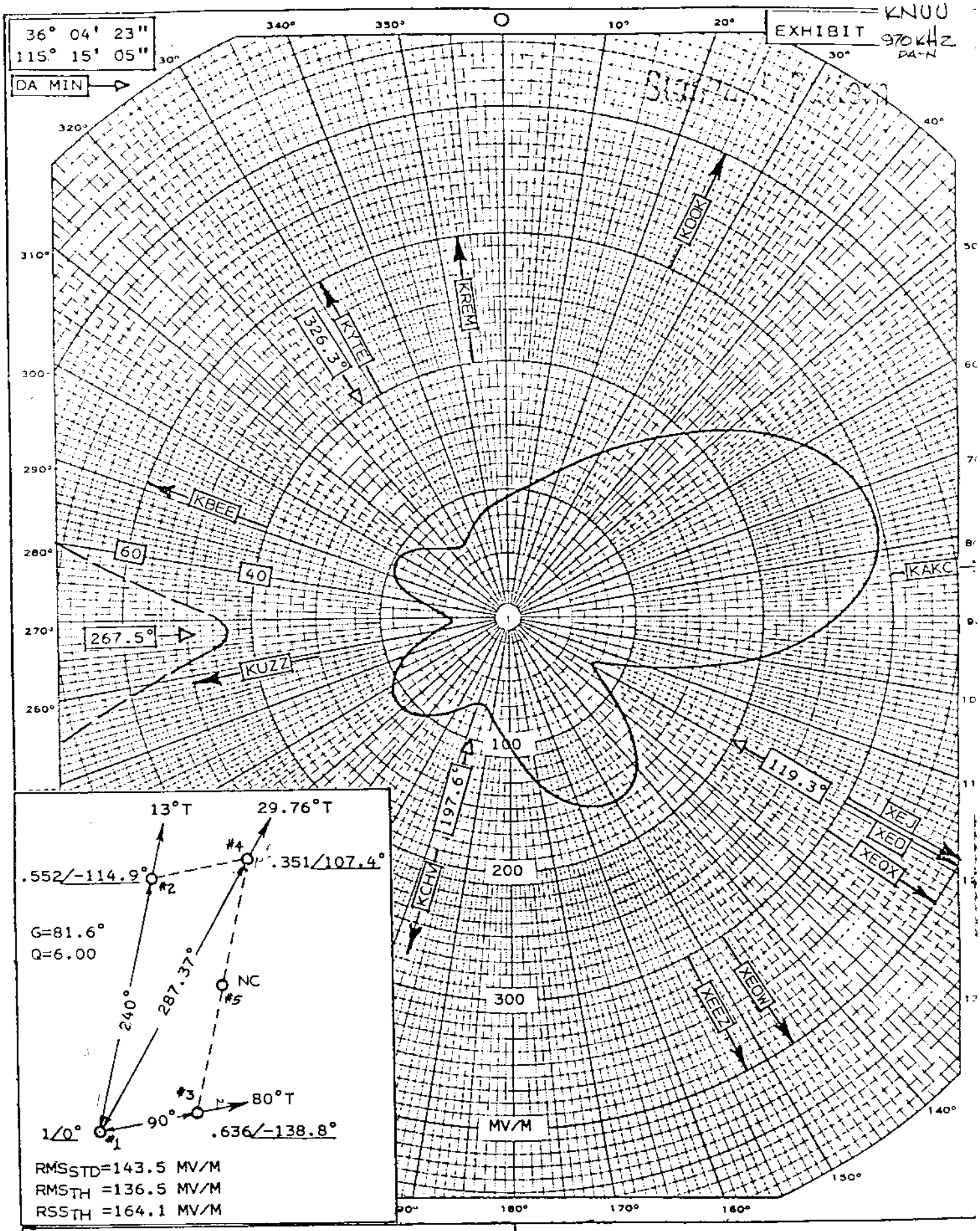


EDWARD F. LORENTZ & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

PROPOSED DAYTIME
STANDARD HORIZONTAL PATTERN

KNUU, PARADISE, NEVADA
970 KHZ, 5 KW-D/0.5 KW-N, DA-2

2,



EDWARD F. LORENTZ & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

PROPOSED NIGHTTIME
STANDARD HORIZONTAL PATTERN

KNUU, PARADISE, NEVADA
970 KHZ, 5 KW-D/0.5-N, DA-2

2/

KOIN

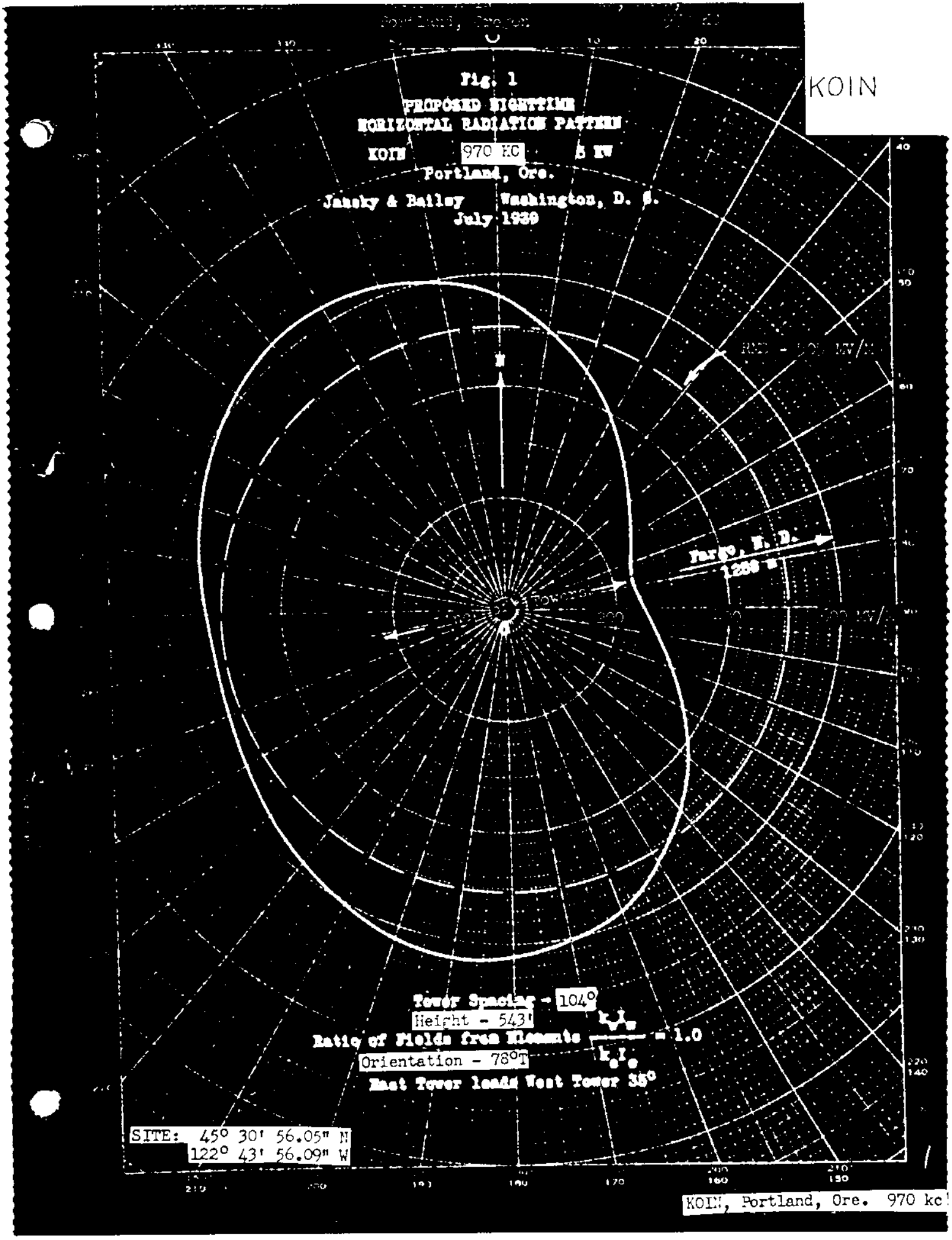
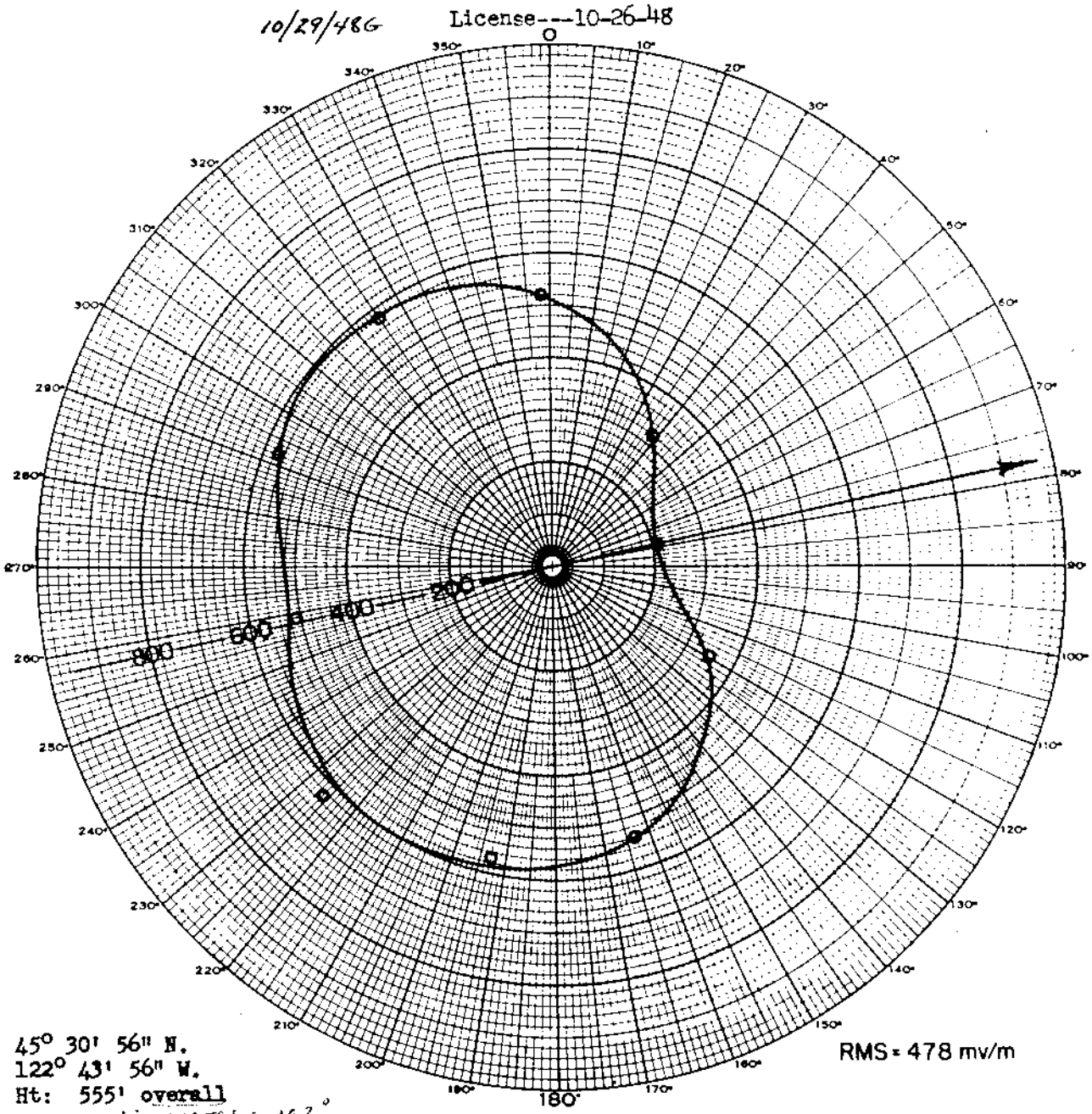


Fig. 1
PROPOSED NIGHTTIME
HORIZONTAL RADIATION PATTERN
KOIN 970 KC 5 KW
Portland, Ore.
Jansky & Bailey Washington, D. C.
July 1939
N
Tower Spacing - 104°
Height - 543'
Ratio of Fields from Elements $\frac{k_w I_w}{k_e I_e} = 1.0$
Orientation - 78°T
East Tower leads West Tower 38°
SITE: 45° 30' 56.05" N
122° 43' 56.09" W
KOIN, Portland, Ore. 970 kc

KOIN
970

KOIN



E. C. PAGE
CONSULTING RADIO ENGINEERS
BOND BUILDING
WASHINGTON 5, D. C

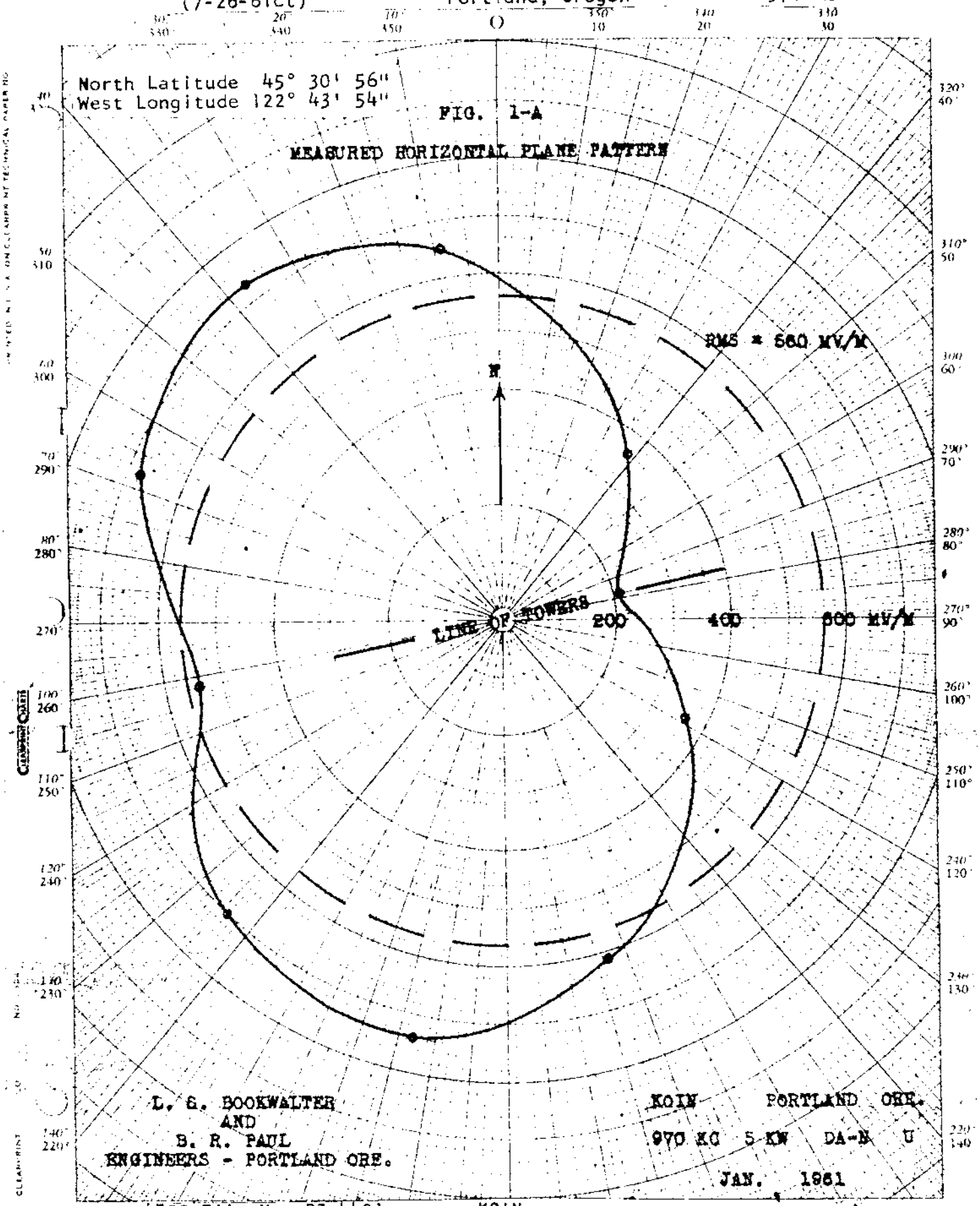
FIGURE 1
Measured Horizontal Plane Pattern
KOIN **Portland, Oregon**
970kc **5 Kw** **DA-N** **U**
RWM:fl **Sept. 8, 1948**

KOIN

MEASURED NIGHT
(7-26-61ct)

Station KOIN
Portland, Oregon

5kw, DA-N,U
970 KC



FCC File No. BZ-4421
Accepted 6-16-61

KOIN
Portland, Oregon

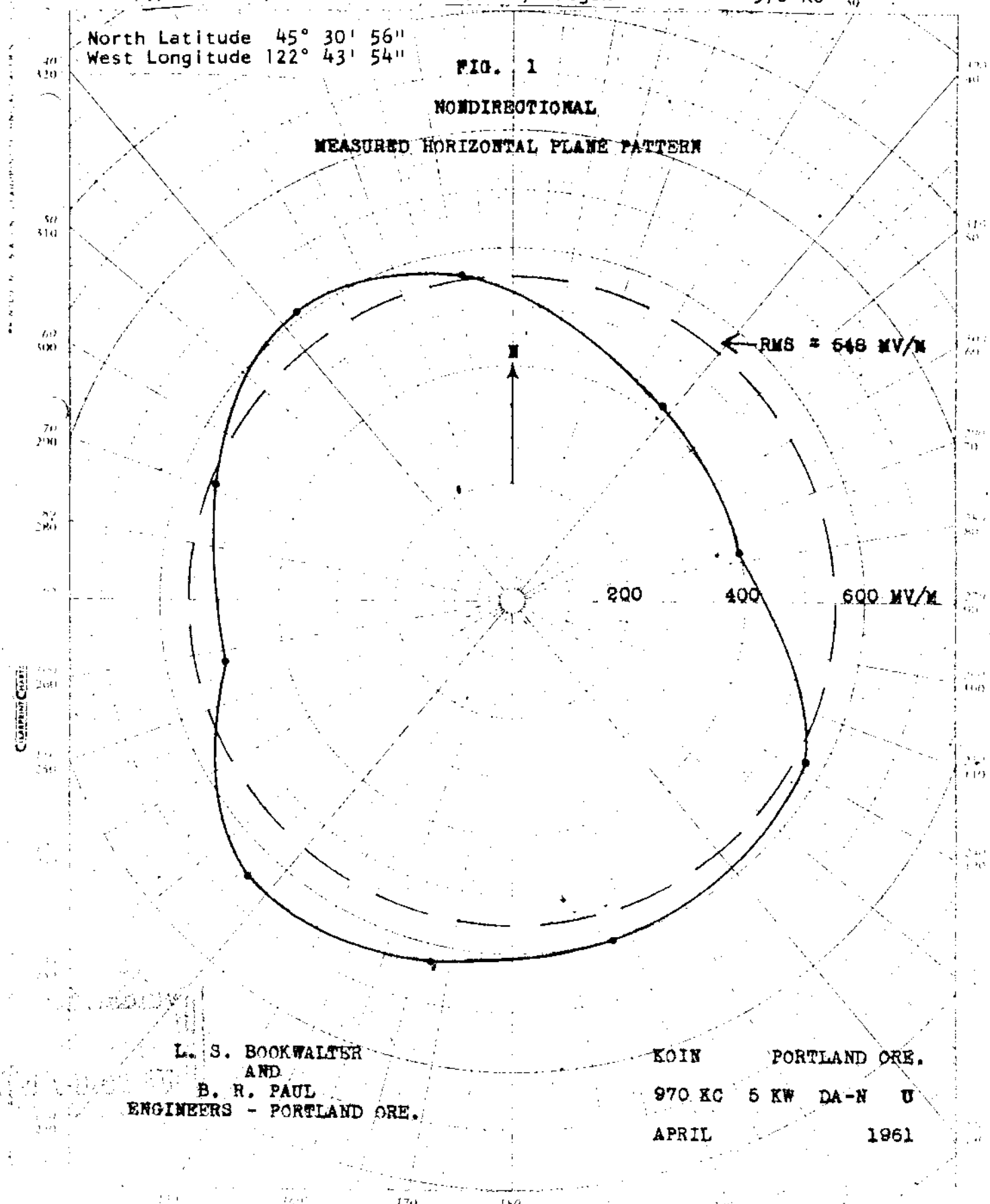
970 KC

KOIN

MEASURED NON-DA
(7-26-61ct)

Station KOIN
Portland, Oregon

5kw, DA-N,U
970 KC



L. S. BOOKWALTER
AND
B. R. PAUL
ENGINEERS - PORTLAND ORE.

KOIN PORTLAND ORE.
970 KC 5 KW DA-N U
APRIL 1961

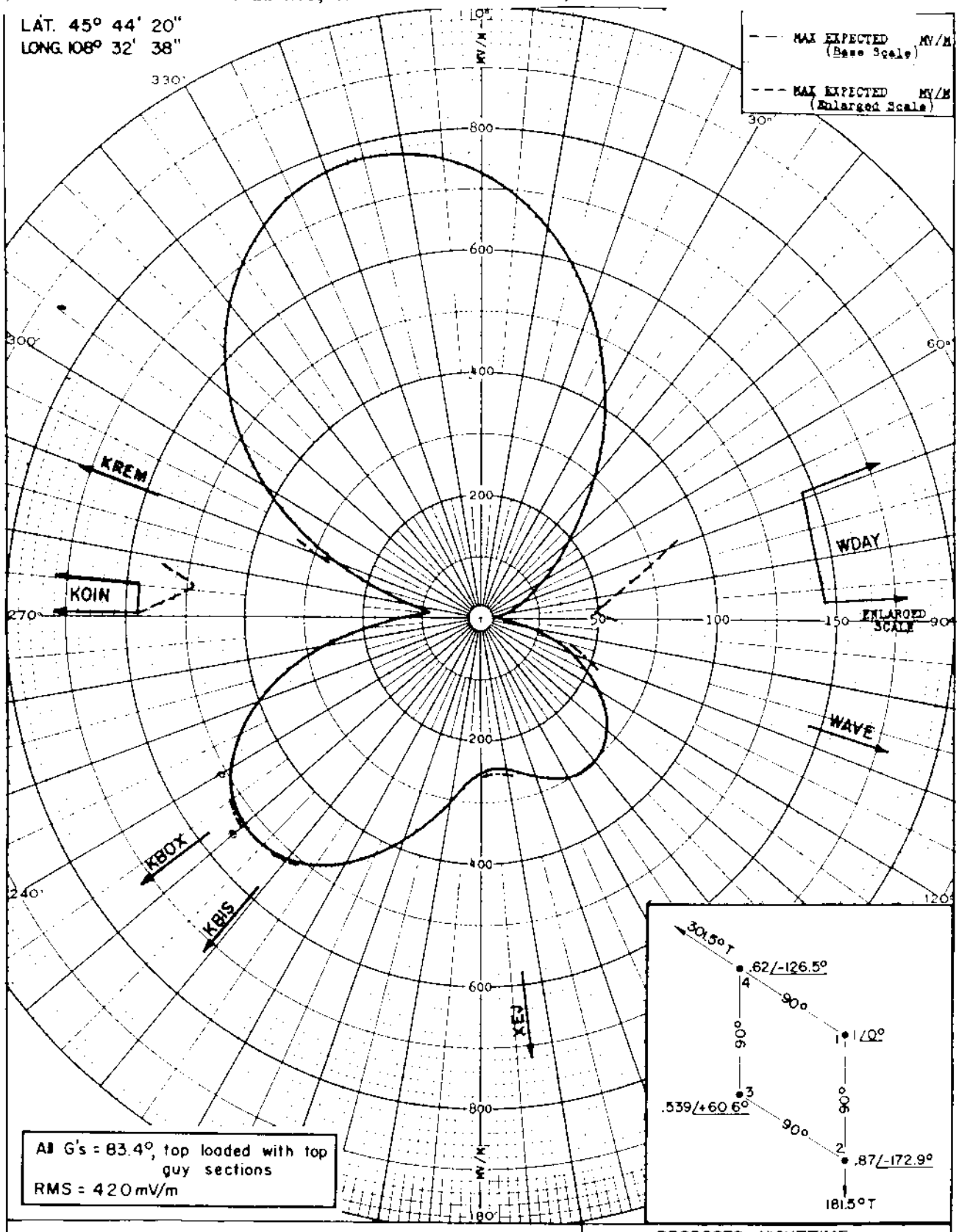
FCC File No. BZ-4421
Accepted 6-16-61

KOIN
Portland, Oregon

970 KC

KOOK

PROPOSED NIGHT (3/22/55G) | STATION KOOK BILLINGS, MONTANA | 5KW DA-N, U | 970 KC



COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON, D.C.

PATTERN: PROPOSED NIGHTTIME
FOR: KOOK, BILLINGS, MONTANA
POWER: 5 KW FREQ: 970 KC
DATE: OCT. 29, 1954

FILE BP-9587 Received 12/23/54 FCC KOOK, Billings, Montana 970 KC

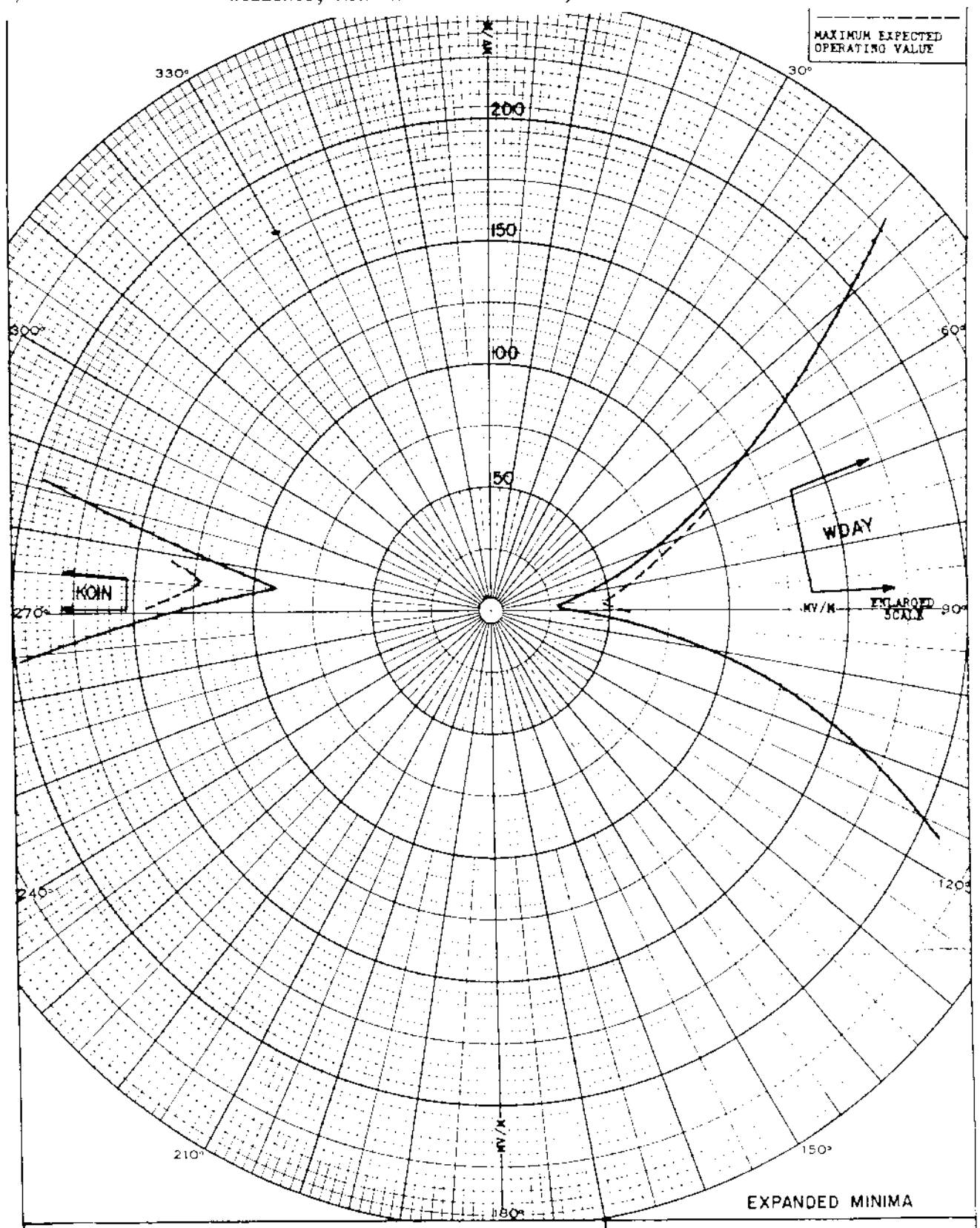
KOOK

PROPOSED NIGHT NULLS (3/22/55G)

STATION KOOK
BILLINGS, MONTANA

5KW
DA-N, U

970 KC



COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON, D. C.

PATTERN: PROPOSED NIGHTTIME
FOR: KOOK, BILLINGS, MONTANA
POWER: 5 KW FREQ: 970 KC
DATE: OCT. 29, 1954

FILE BP-9567 Received 12/23/54 FCC KOOK, Billings, Montana 970 KC

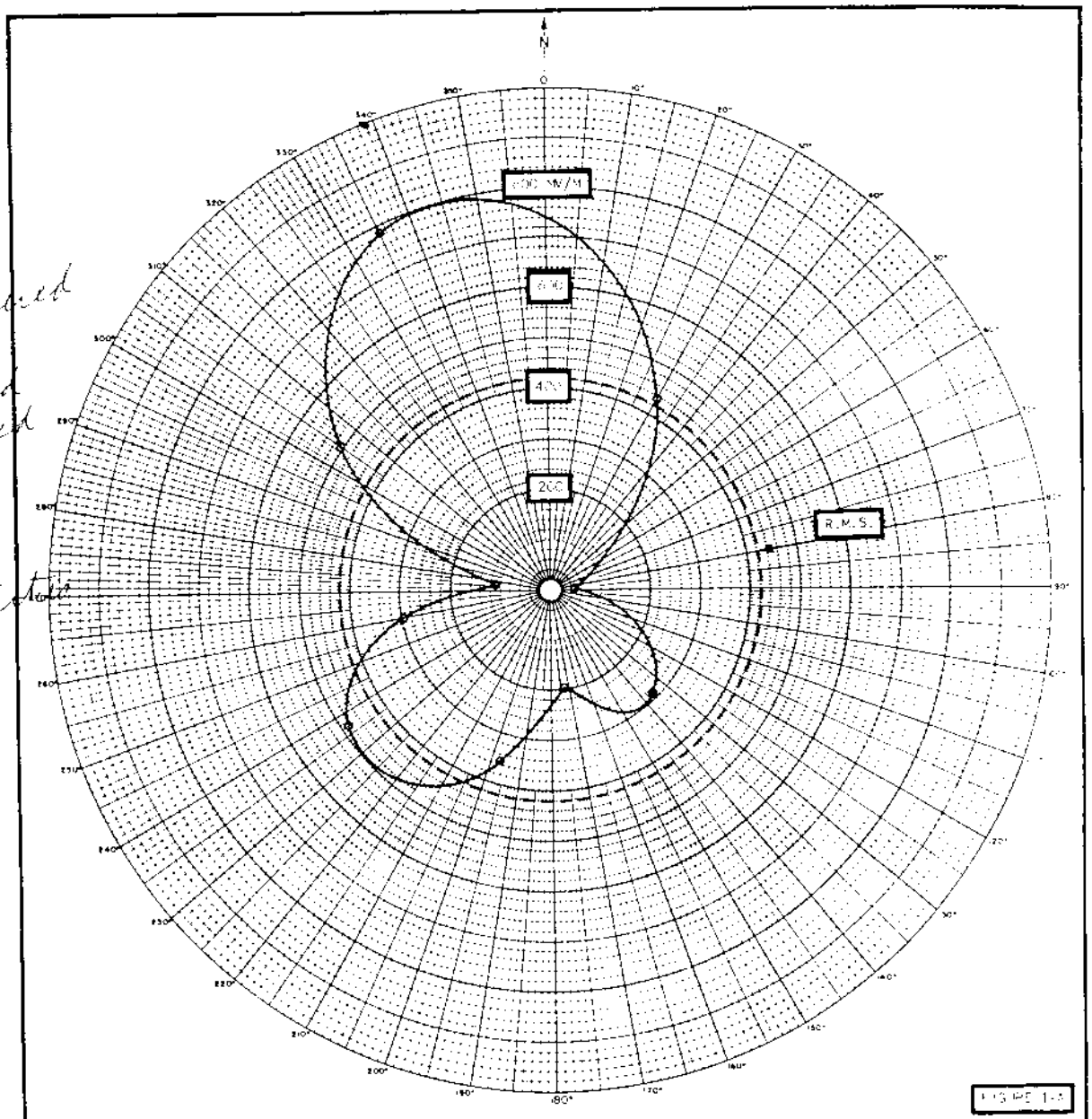
KOOK

Measured Night
(8-22-69ct)

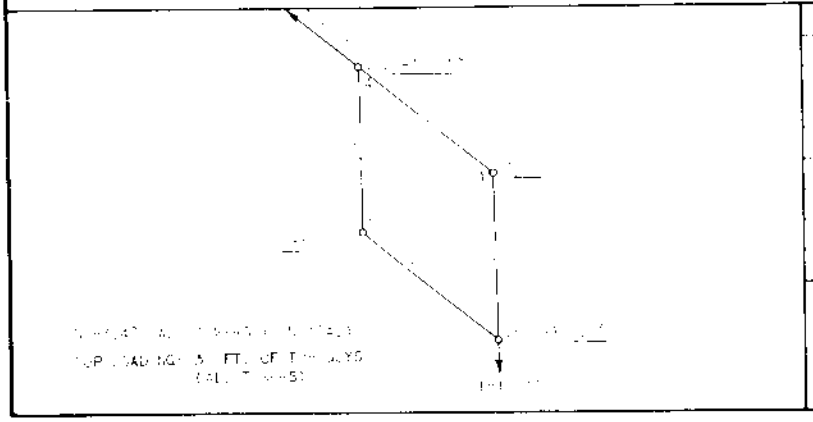
Station KOOK
Billings, Montana

5kw, DA-N, U
970 kc

BL-12421
Granted
12-12-69
License
covering
non-directional
permit
as proposed
pattern filed
to change
readings
to reflect
field intensities



HORIZONTAL RADIATION PATTERN



APPLICANT KOOK
LOCATION BILLINGS, MONTANA
FREQUENCY 970 KC/S
POWER 5 KW
LATITUDE 45 DEG 44 MIN 7 SEC
LONGITUDE 108 DEG 32 MIN 7 SEC
WHEN USED NIGHTTIME
R.M.S. FIELD 421.4 MV/M
DATE APRIL 28, 1

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No.BL-12421
Accepted 8-15-69

Station KOOK
Billings, Montana

970 kc

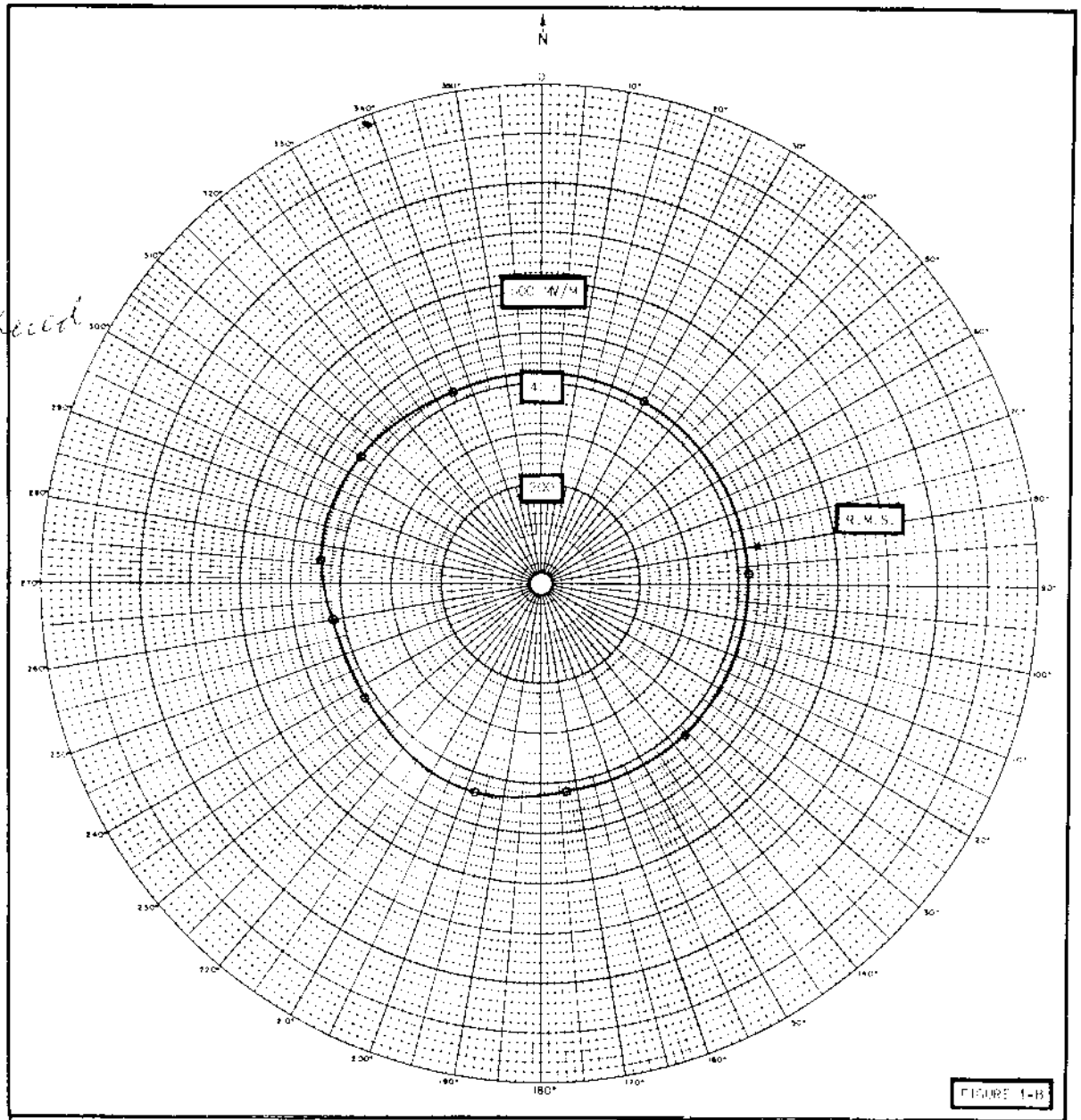
KOOK

Measured Non-DA
(8-22-69ct)

Station KOOK
Billings, Montana

5kw,DA-N,U
970 kc

BL-12421
Granted
8-15-69
license
covering
use modified
permit in
proposed
pattern
filed to
change
bearings &
correct
field in
directions



HORIZONTAL RADIATION PATTERN

NON-DIRECTIONAL SURVEY

APPLICANT KOOK
LOCATION BILLINGS, MONTANA
FREQUENCY 970 KC/S
POWER 5 KW
LATITUDE 45 DEG 46 MIN 36 SEC
LONGITUDE 108 DEG 32 MIN 36 SEC
WHEN USED DAYTIME
RMS FIELD 423.5 MV/M
DATE SEPT 1, 2, 3, 1969

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No.BL-12421
Accepted 8-15-69

Station KOOK
Billings, Montana

970 kc

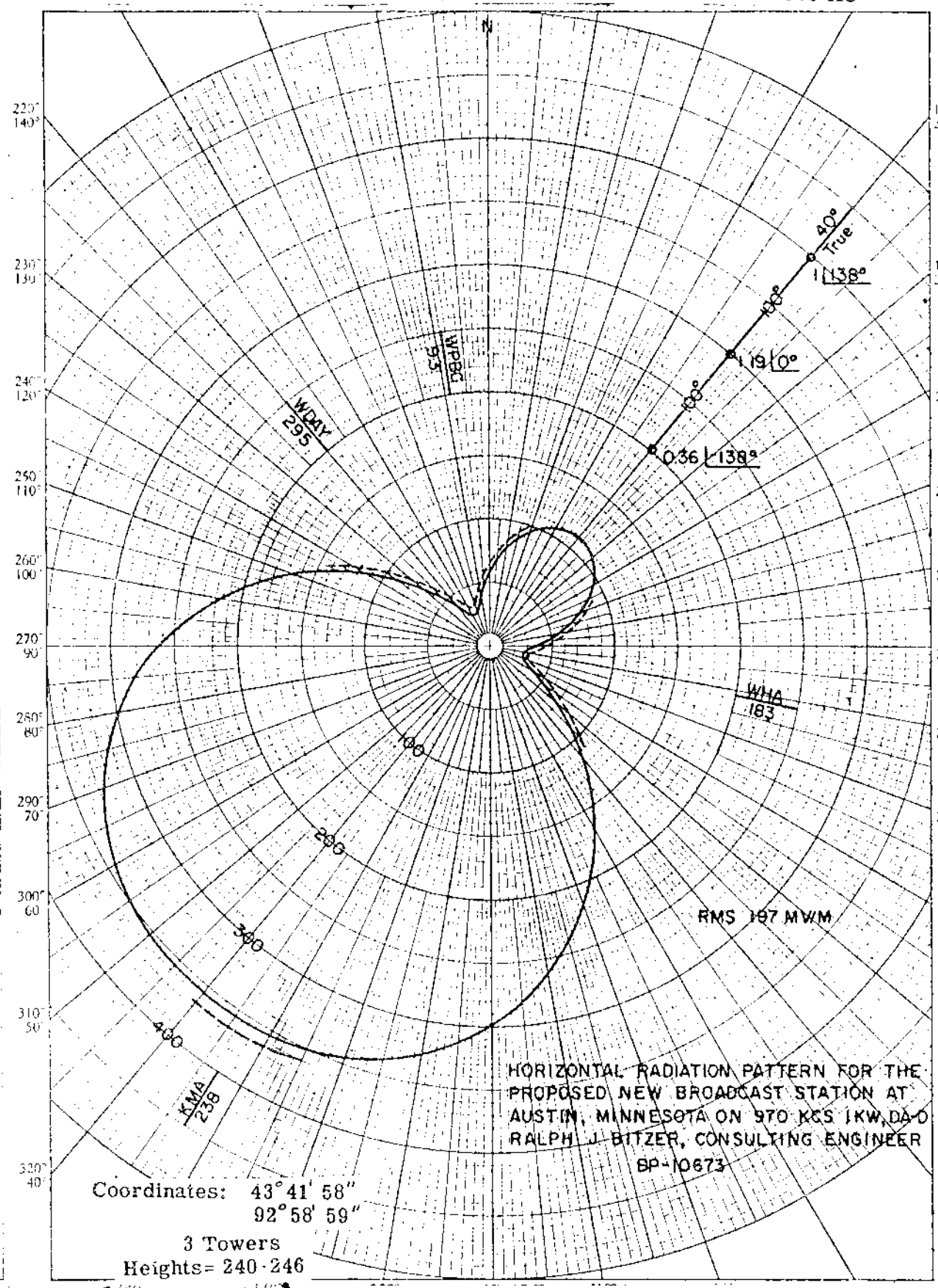
Austin, Minn.
KQAQ

PROPOSED DAY
(4/5/57g)

George A. Hormell, II
Austin, Minnesota

1kw, DA-D,D
970 KC

Granted CP 9/19/57 for new station



FCC File No. BP-10,673 (Ammended)
Accepted 3/18/57

George A. Hormell, II
Austin, Minnesota

970 KC

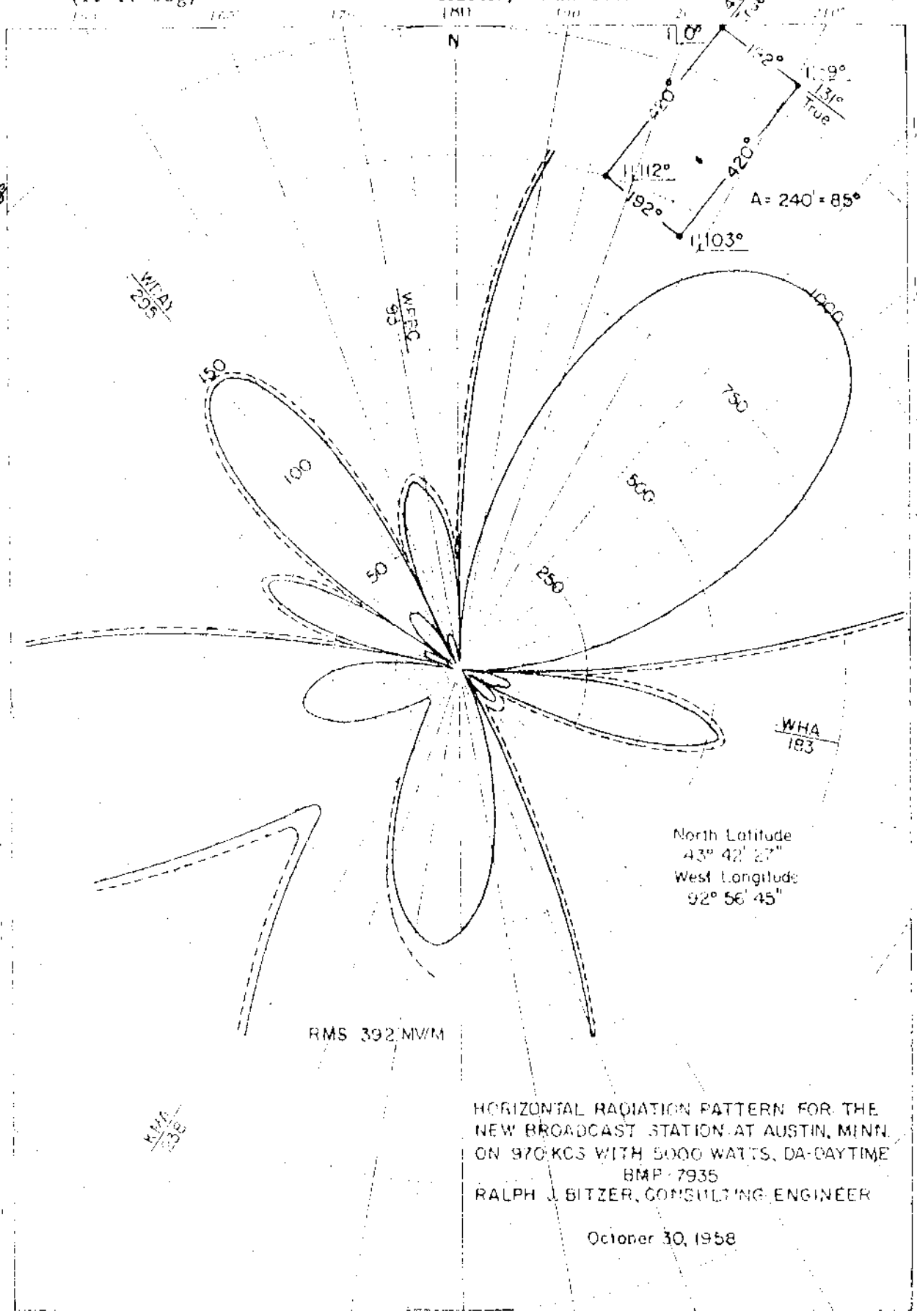
KQAQ

PROPOSED DAY
(11-17-58g)

Station KQAQ
Austin, Minnesota

5kw, DA-D, D
970 KC

Granted Mod of CP 12/23/58 for increase in power



HORIZONTAL RADIATION PATTERN FOR THE NEW BROADCAST STATION AT AUSTIN, MINN. ON 970 KCS WITH 5000 WATTS, DA-DAYTIME
BMP-7935
RALPH J. BITZER, CONSULTING ENGINEER

October 30, 1958

FCC File No. BMP-7935
Accepted 11-12-58 Amended

KQAQ
Austin, Minnesota

970 KC

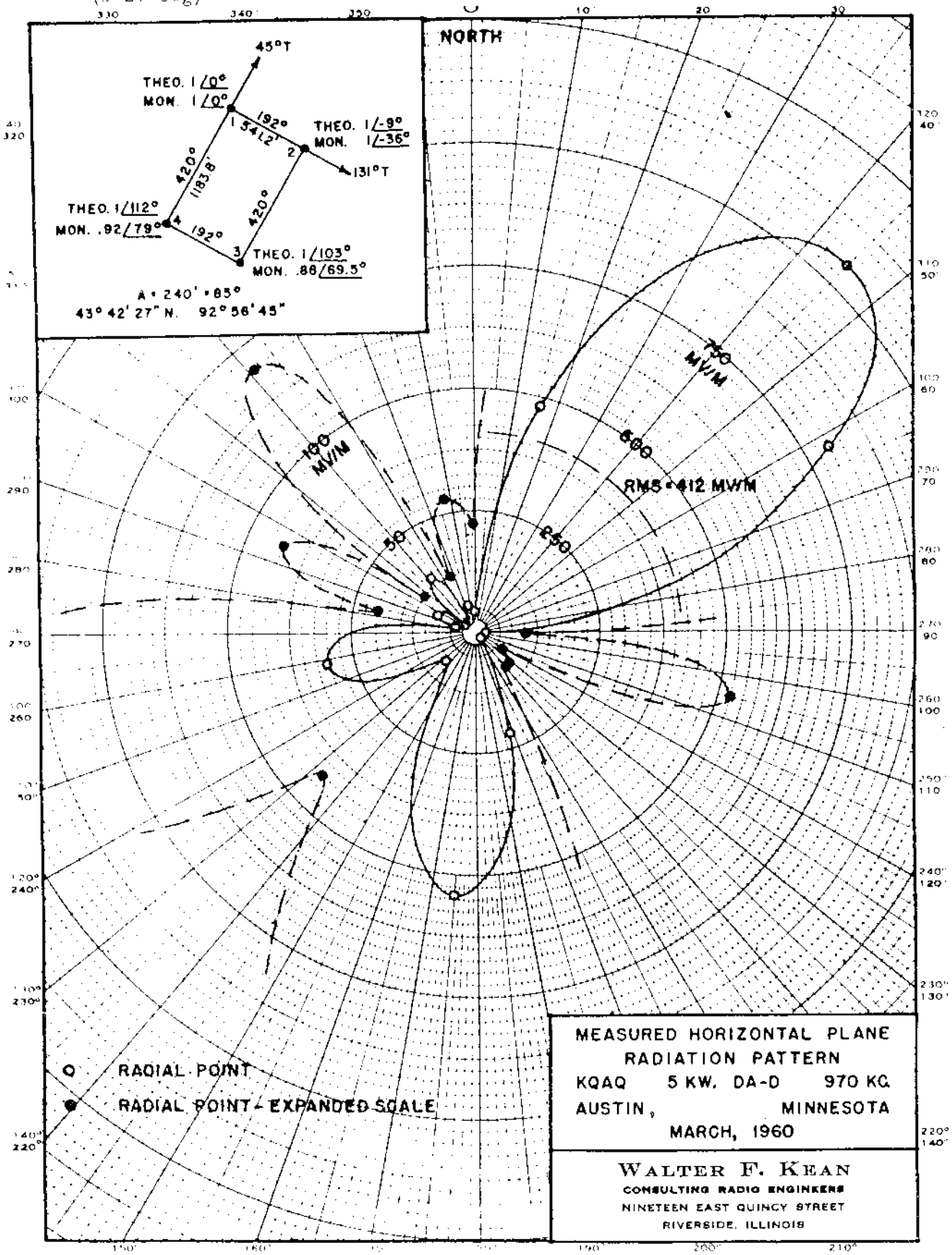
KQAQ

MEASURED DAY
(5-27-60g)

Station KQAQ
Austin, Minnesota

5kw, DA-1

970 KC



FCC File No. BL-7901
Accepted 4-29-60

KQAQ
Austin, Minnesota

970 KC

Previous [illegible] and station
6-27-60

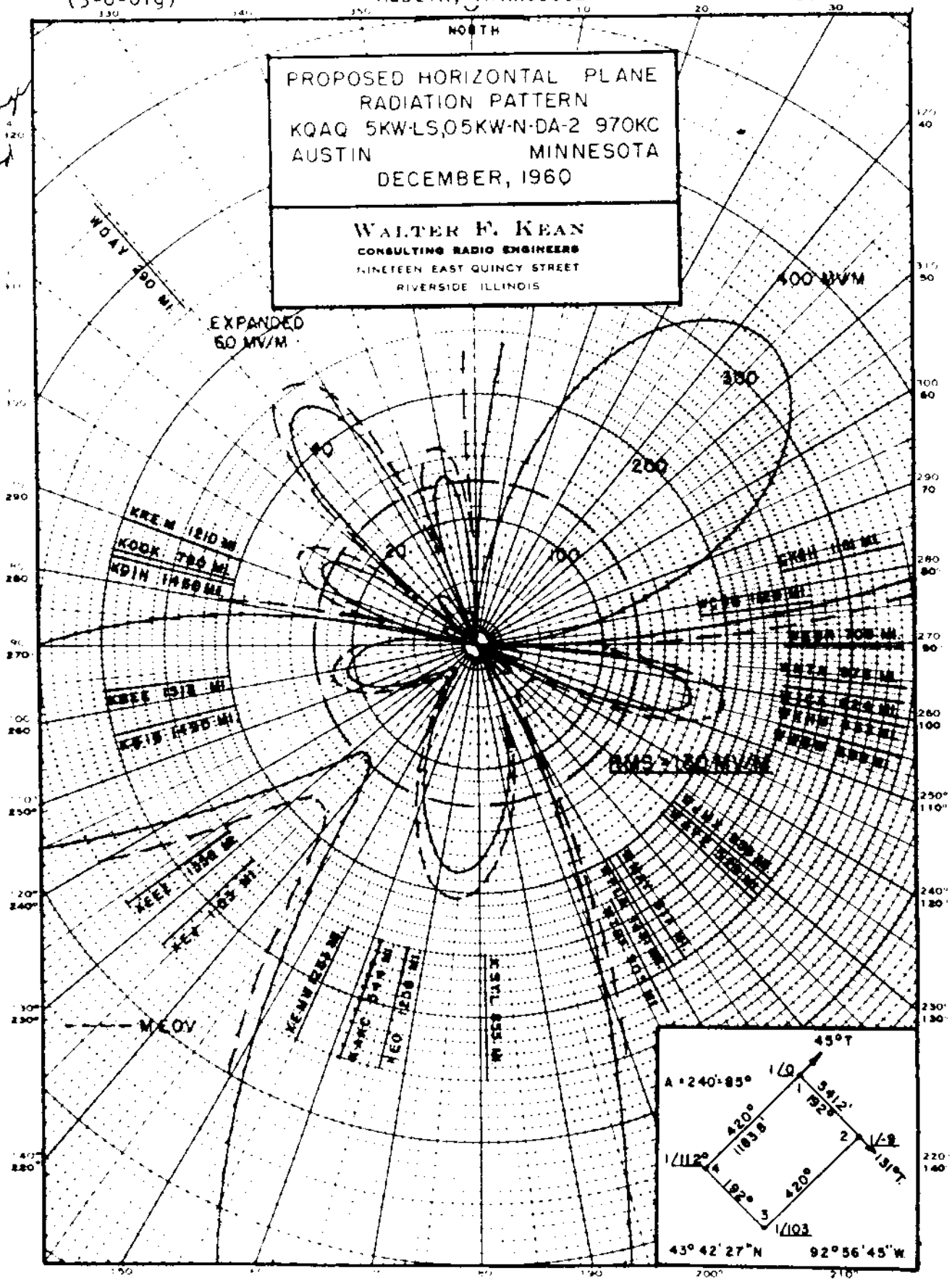
KQAQ

PROPOSED NIGHT
(3-8-61g)

Station KQAQ
Austin, Minnesota

500w,5kw-LS, DA-2,U
970 KC

6-20-62
granted change
to U with
500w night and
fr DA-2.



FCC File No. BP-14637
Accepted 3-2-61

Station KQAQ
Austin, Minnesota

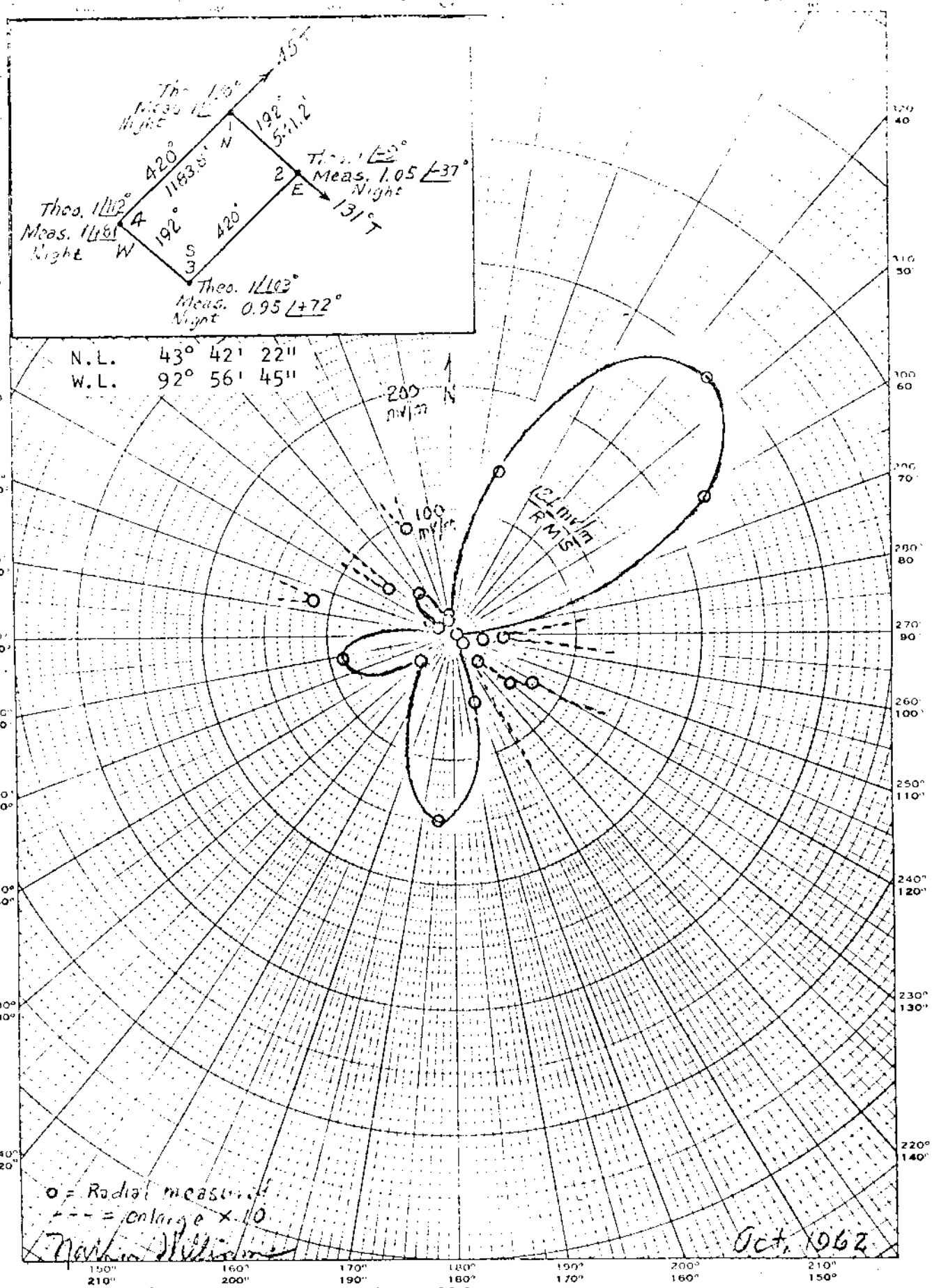
970 KC

KQAQ

Measured Night
(4-30-63ct)

Station KQAQ
Austin, Minnesota

500w,5kw-LS,DA-2,U
970 kc



FCC File No.BL-9870
Accepted 4-10-63

Station KQAQ
Austin, Minnesota

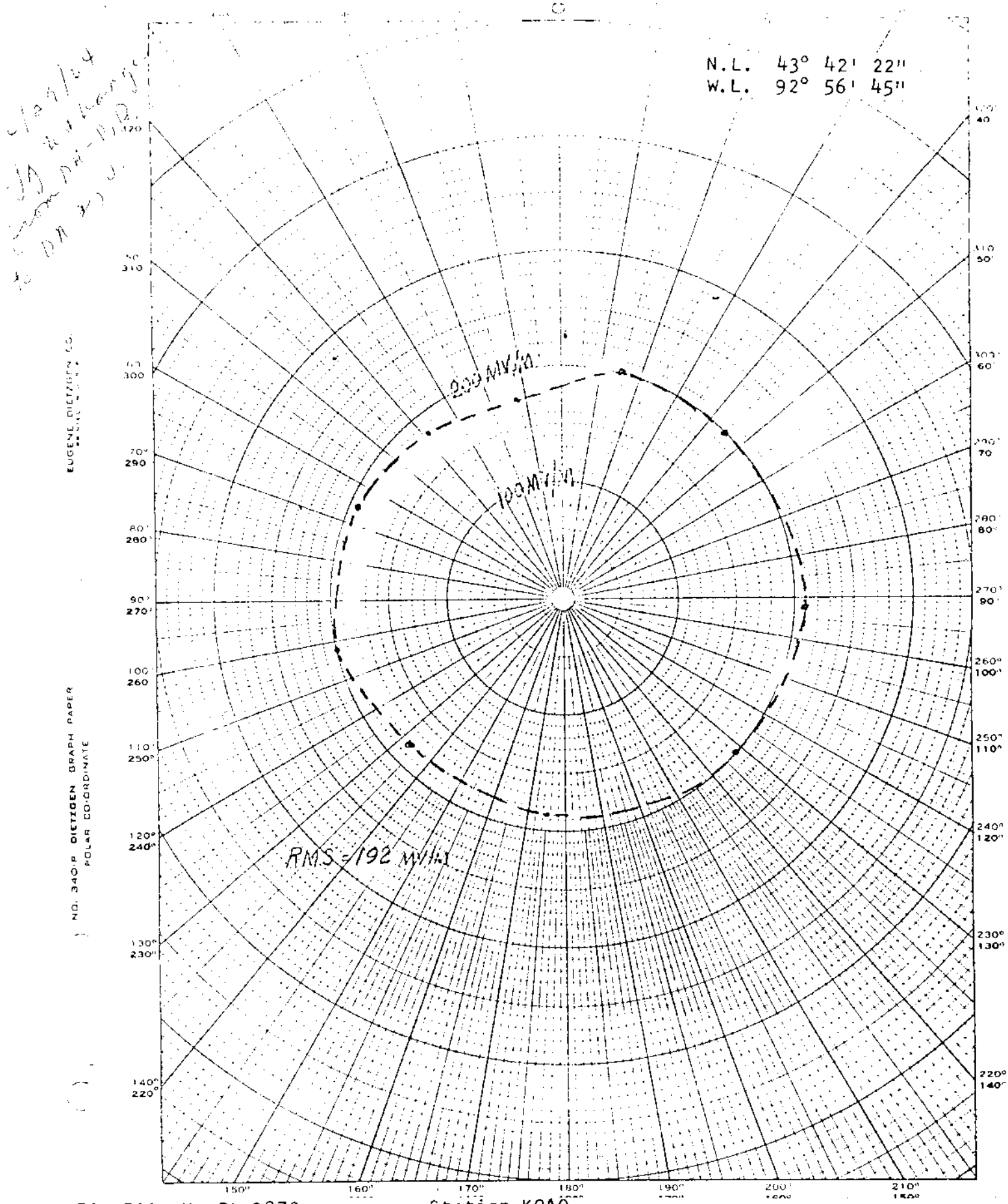
970 kc

KQAQ

Measured Non-DA
(4-30-63ct)

Station KQAQ
Austin, Minnesota

500w,5kw-LS,DA-2,U
970 kc



FCC File No.BL-9870
Accepted 4-10-63

Station KQAQ
Austin, Minnesota

970 kc

KREM

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station	: KREM	Main Studio:	Spokane, Washington
Frequency	: 970 KHz	Power	: 1 kW Night 5 kW Day
Notification	: 1780	Date	: Sept. 28, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude:	47	36	59
West Longitude:	117	21	55

Note: Please retain the description sheet notified for station KREM in United Sates Change List Number 358, dated April 13, 1953 and attach to this supplemental Description Sheet. This notification is for the purpose of indicating only a change in the nighttime radiation pattern MEOV's.

KREM

SITE: 47° 36' 59" N
117° 21' 55" W

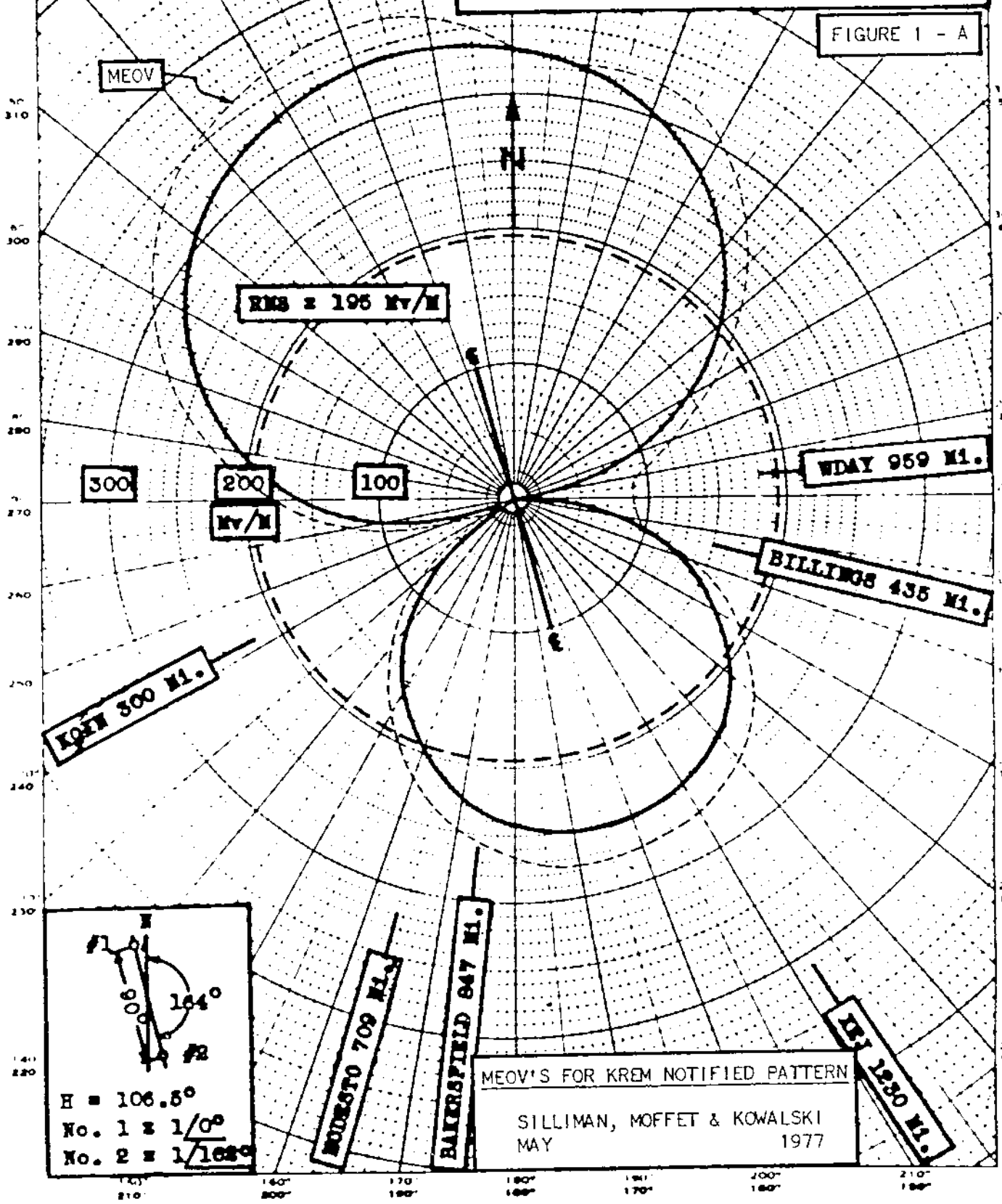
PATTERN NO. 491020

HORIZONTAL PLANE RADIATION PATTERN
Proposed Night Operation

Station KREM Spokane, Wash.

970 Kc. 1 Kw. DA-N U

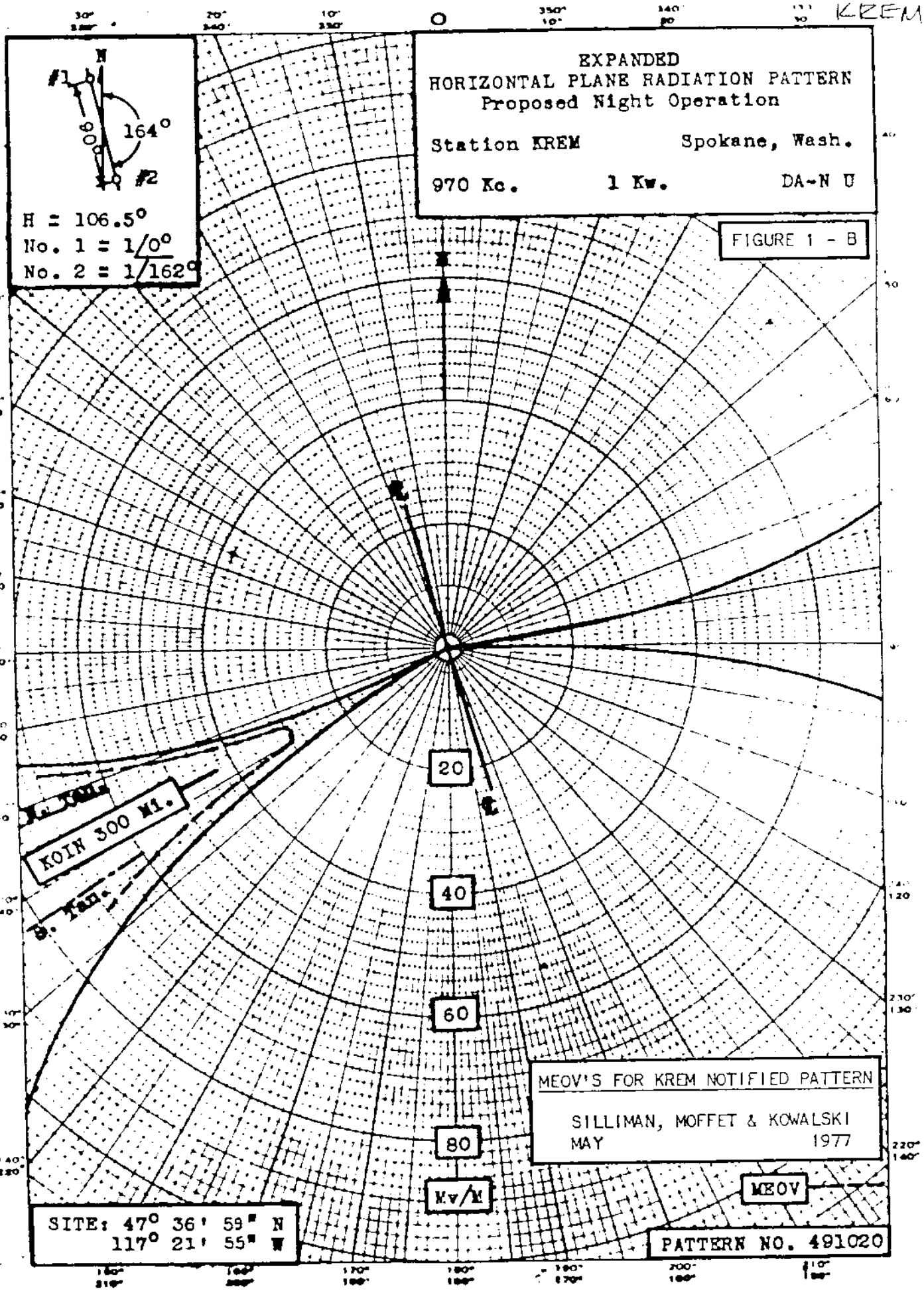
FIGURE 1 - A



MEOV'S FOR KREM NOTIFIED PATTERN

SILLIMAN, MOFFET & KOWALSKI
MAY 1977

KREM


EXPANDED
HORIZONTAL PLANE RADIATION PATTERN
Proposed Night Operation
Station KREM
Spokane, Wash.
970 Kc.
1 Kw.
DA-N U
FIGURE 1 - B
N
#1
#2
90
164°
H = 106.5°
No. 1 = 1/0°
No. 2 = 1/162°
20
40
60
80
Mv/M
KOIN 300 Mi.
MEOV'S FOR KREM NOTIFIED PATTERN
SILLIMAN, MOFFET & KOWALSKI
MAY 1977
MEOV
SITE: 47° 36' 59" N
117° 21' 55" W
PATTERN NO. 491020

KREM

PROPOSED NIGHT KREM, SPOKANE, WASH. 1kw, DAN 970 kc

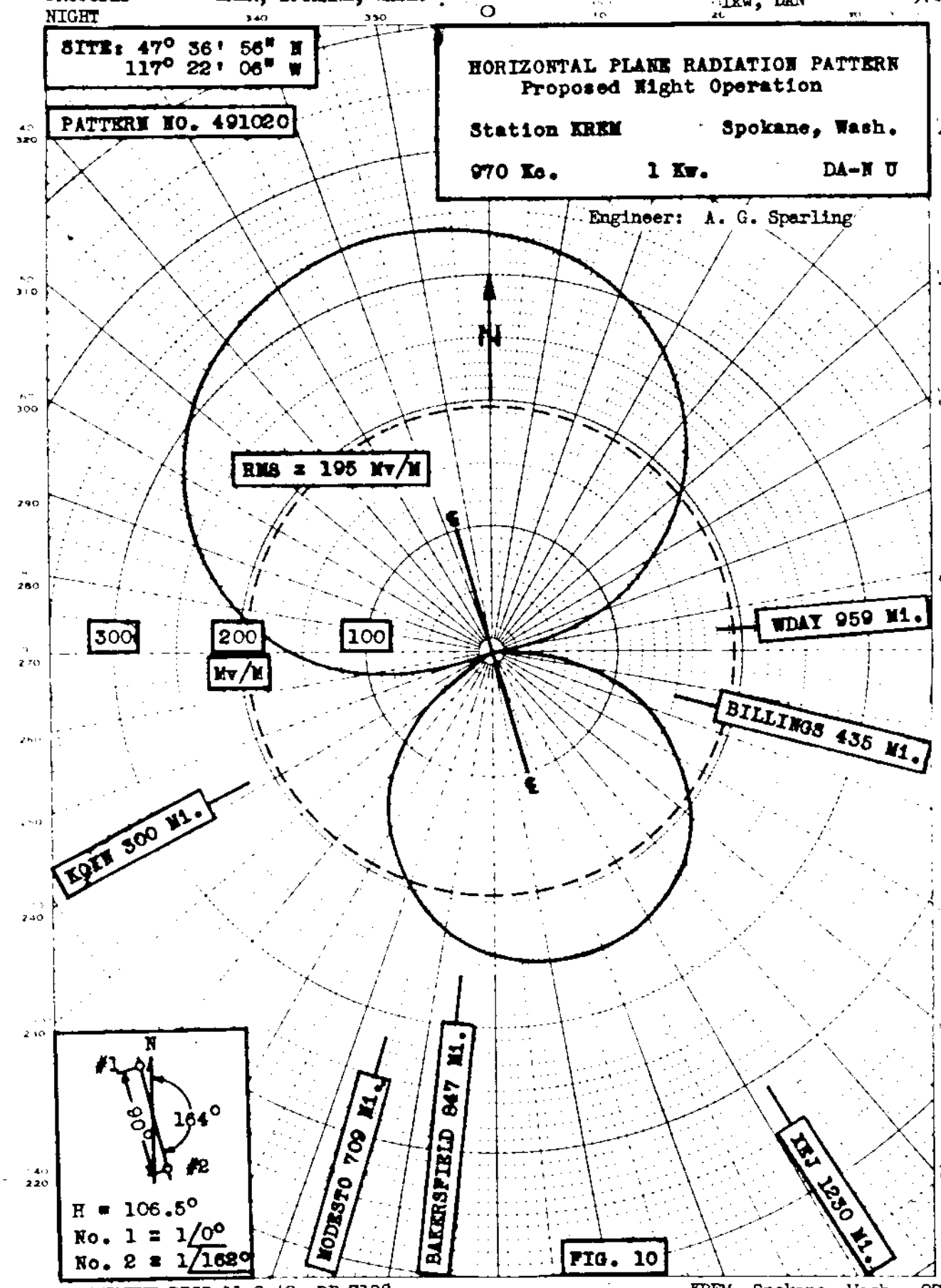


FIG. 10

AMENDMENT RECD 11-9-49 BP-7128

KREM, Spokane, Wash. 970 kc

KREM

PROPOSED NIGHT NULLS — KREM, SPOKANE, WASH. — 1kw, DAN — 970 kc

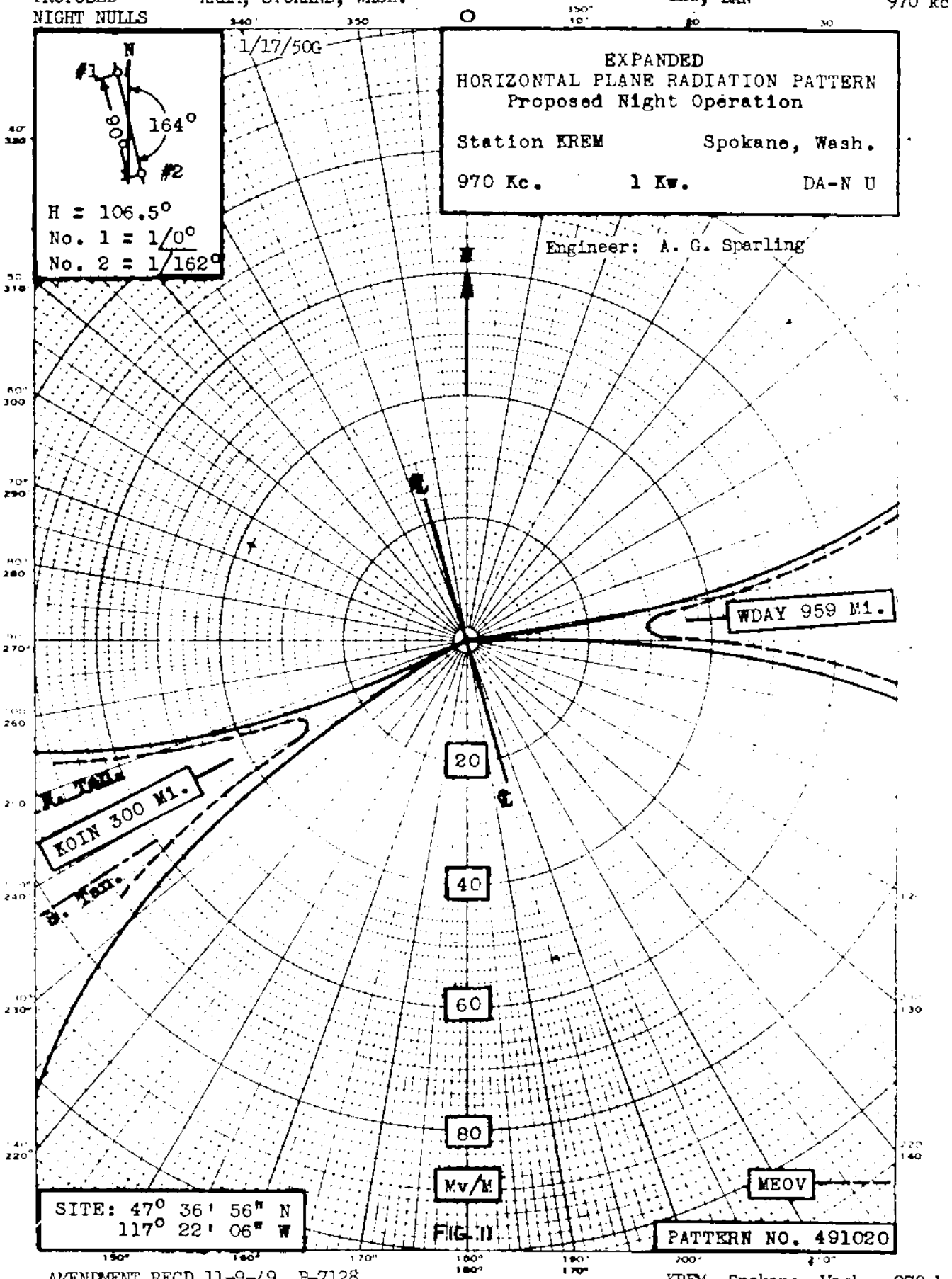


FIG. II

AMENDMENT RECD 11-9-49 P-7128

KREM, Spokane, Wash. 970 kc

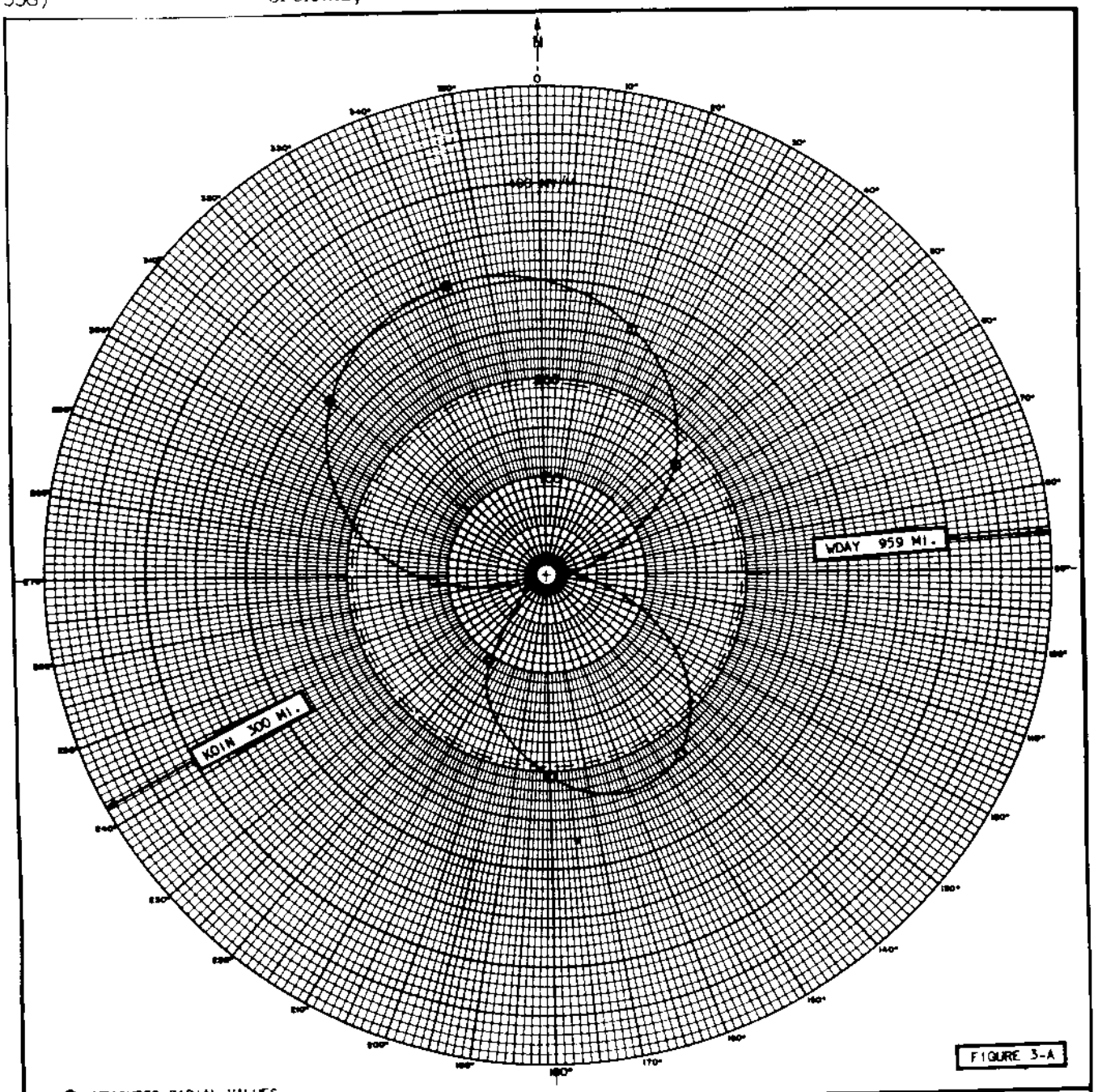
KREM

MEASURED NIGHT
(4/11/55G)

STATION KREM
SPOKANE, WASHINGTON

1KW,5KW-LS
DA-N, U

970 KC



O MEASURED RADIAL VALUES

KREM - SPOKANE, WASHINGTON

HORIZONTAL RADIATION PATTERN

(MEASURED NIGHT)

	(NORTH	(SOUTH)				
ANTENNA	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6
PHASE DEG.	0°	+ 162°				
HEIGHT DEG.	106.5°	106.5°				
FIELD RATIO	1.0	1.0				
NON-DA ANT.						

ORIENTATION - ON A LINE BEARING N 164° E SPACING 90°

FREQUENCY:	970 KC.
ASSIGNMENT:	5 Kw-LS, 1 Kw-N(DA)
LONGITUDE:	117 DEG. 21 MIN. 55 SEC.
LATITUDE:	47 DEG. 36 MIN. 59 SEC.
WHEN USED:	NIGHTTIME
R.M.S. FIELD:	196 MV/M
DATE:	FEBRUARY 1955

ROBERT M. SILLIMAN

CONSULTING RADIO ENGINEERS

WASHINGTON, D. C.

FILE NO. BL-5666 Accepted 3/28/55 FCC KREM, Spokane, Washington 970 KC

MEASURED NIGHT NULLS (4/11/55G)

STATION KREM
SPOKANE, WASHINGTON

1KW,5KW-LS
DA-N, U

970 kc

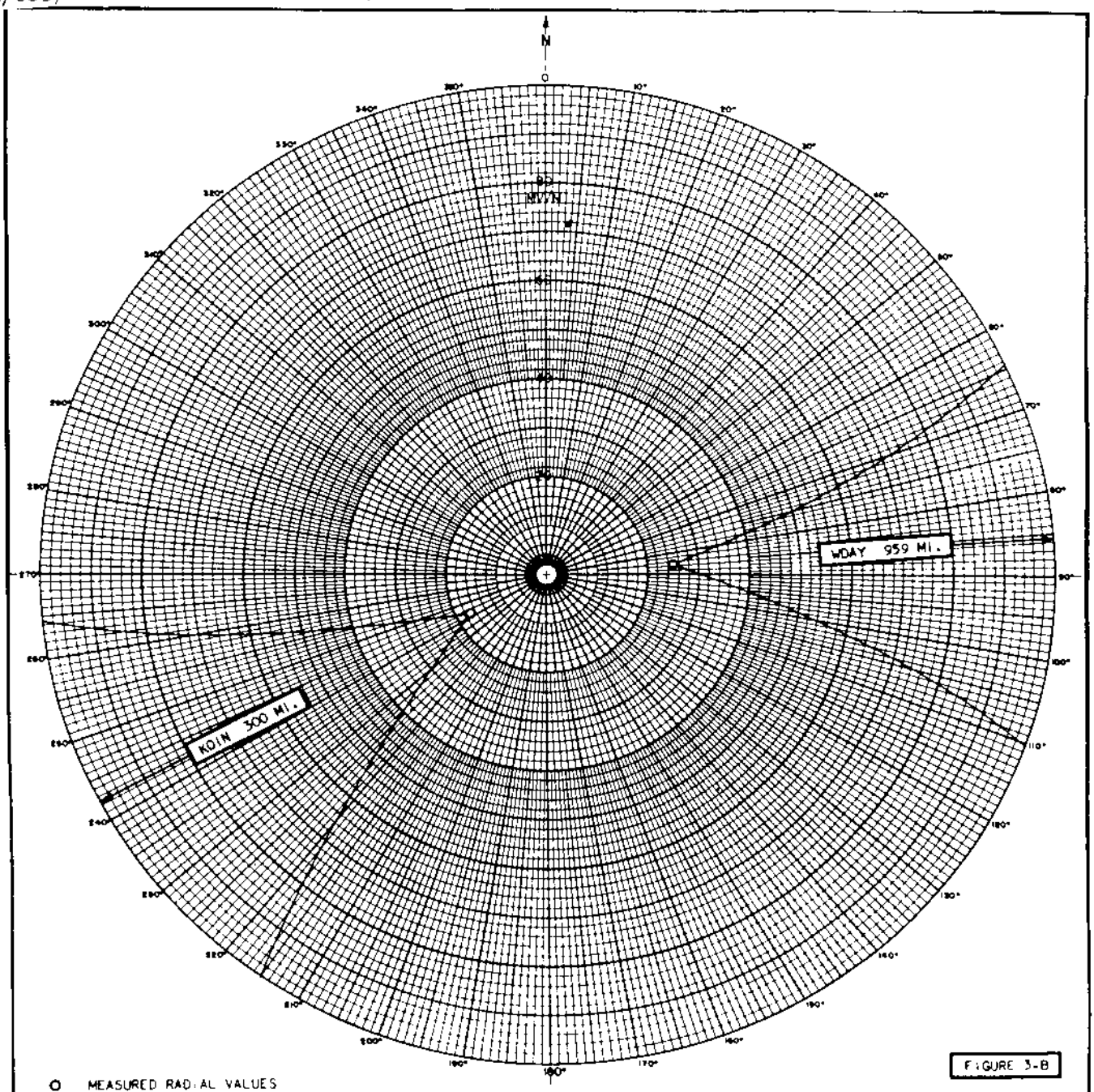


FIGURE 3-B

KREM - SPOKANE, WASHINGTON

HORIZONTAL RADIATION PATTERN

(MEASURED NIGHT - EXPANDED VIEW)

	(NORTH)	(SOUTH)				
ANTENNA	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6
PHASE DEG	0°	+162°				
HEIGHT DEG	106.5°	106.5°				
FIELD RATIO	1.0	1.0				
NON-DA ANT.						

ORIENTATION - ON A LINE BEARING N 164° E SPACING 90°

FREQUENCY	970 KC
ASSIGNMENT	5 Kw-LS, 1 Kw-N(DA)
LONGITUDE	117 DEG. 21 MIN. 55 SEC.
LATITUDE	47 DEG. 36 MIN. 59 SEC.
WHEN USED	NIGHTTIME
R.M.S. FIELD	196 MV/M
DATE	FEBRUARY 1955

ROBERT M. SILLIMAN
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

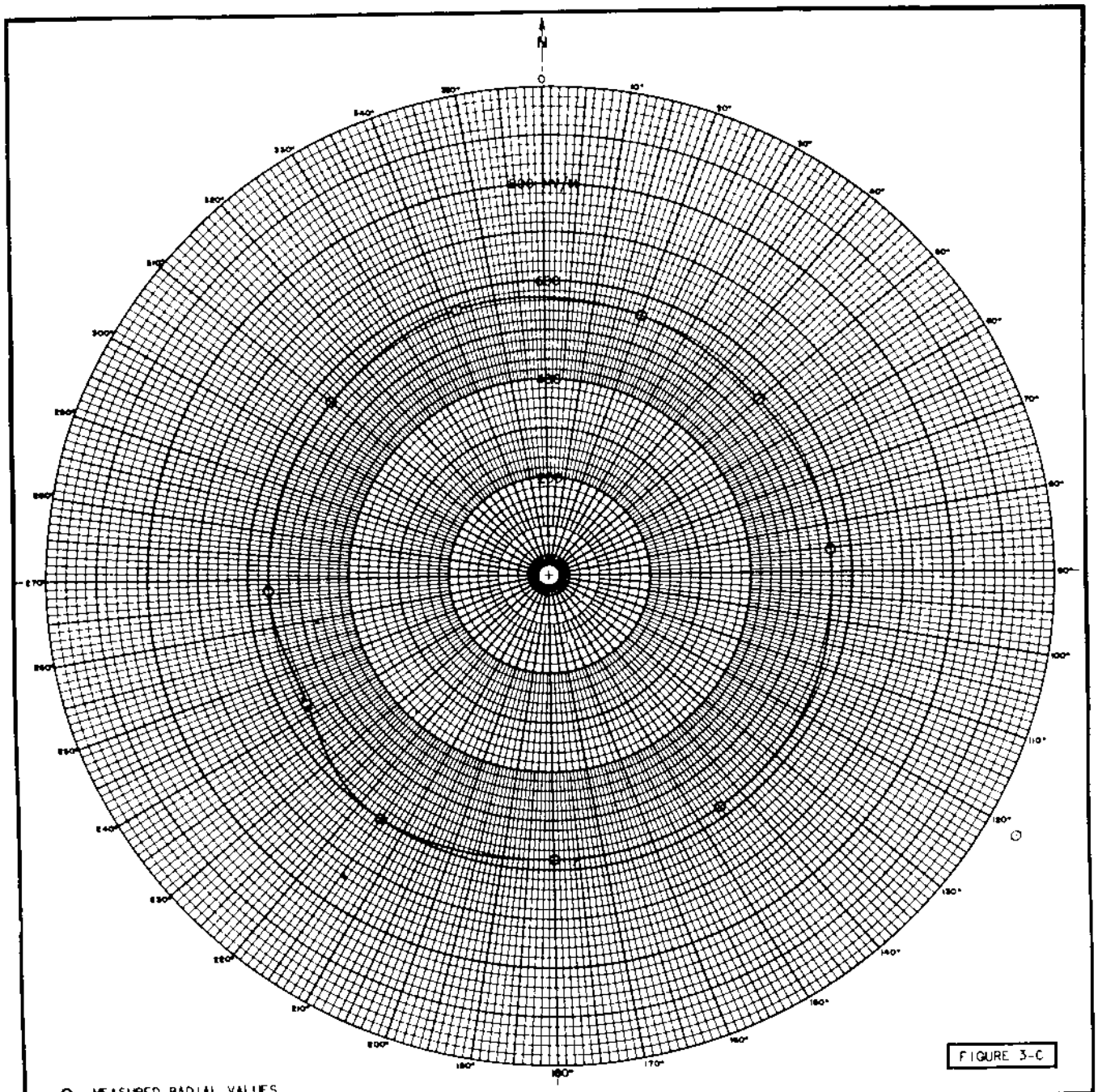
FILE NO. BL-5666 Accepted 3/28/55 FCC KREM, Spokane, Washington 970 KC

KREM

MEASURED NON-DIRECTIONAL STATION KREM
(4/11/55G)
SPOKANE, WASHINGTON

1KW, 5KW-LS
DA-N, U

970 KC



O MEASURED RADIAL VALUES

KREM - SPOKANE, WASHINGTON

HORIZONTAL RADIATION PATTERN

(MEASURED DAY NON-DIRECTIONAL)

	(NORTH)	(SOUTH)				
ANTENNA	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6
PHASE DEG						
HEIGHT DEG	263.5°					
FIELD RATIO						
NON-DA ANT.	*					

NOTE: NON-DIRECTIONAL TOWER FED AS A FRANKLIN.

FREQUENCY:	970 KC
ASSIGNMENT:	5 KW-LS, 1 KW-N(DA)
LONGITUDE:	117 DEG. 21 MIN. 55 SEC.
LATITUDE:	47 DEG. 36 MIN. 59 SEC.
WHEN USED:	DAYTIME
R.M.S. FIELD:	565 MV/M
DATE:	FEBRUARY 1955

ROBERT M. SILLIMAN

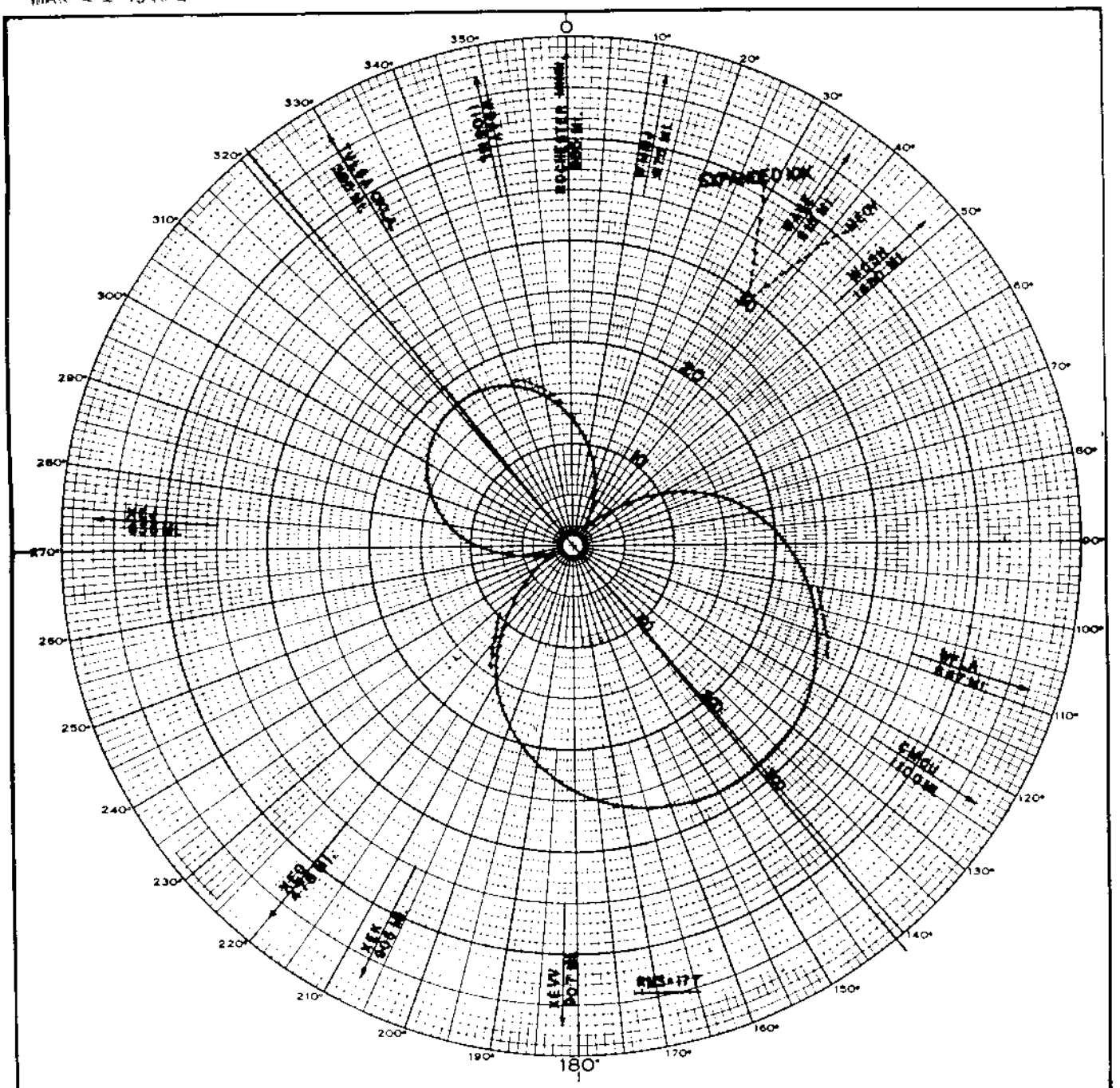
CONSULTING RADIO ENGINEERS

WASHINGTON, D. C.

FILE NO. BL-5666 Accepted 3/28/55 FCC KREM, Spokane, Washington 970 KC

KSYL 970

MAR 24 1948 G



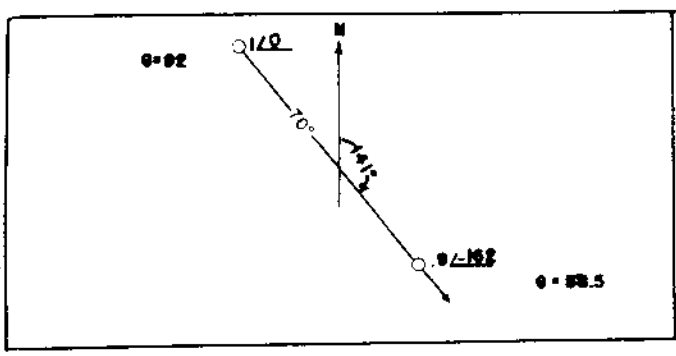


FIGURE 1 (Amended)
HORIZONTAL PLANE PATTERN
PROPOSED KPDR
ALEXANDRIA, LOUISIANA
970kc 1 Kw U DA-N

E. C. PAGE
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.
VE:FL MAR. 12, 1948

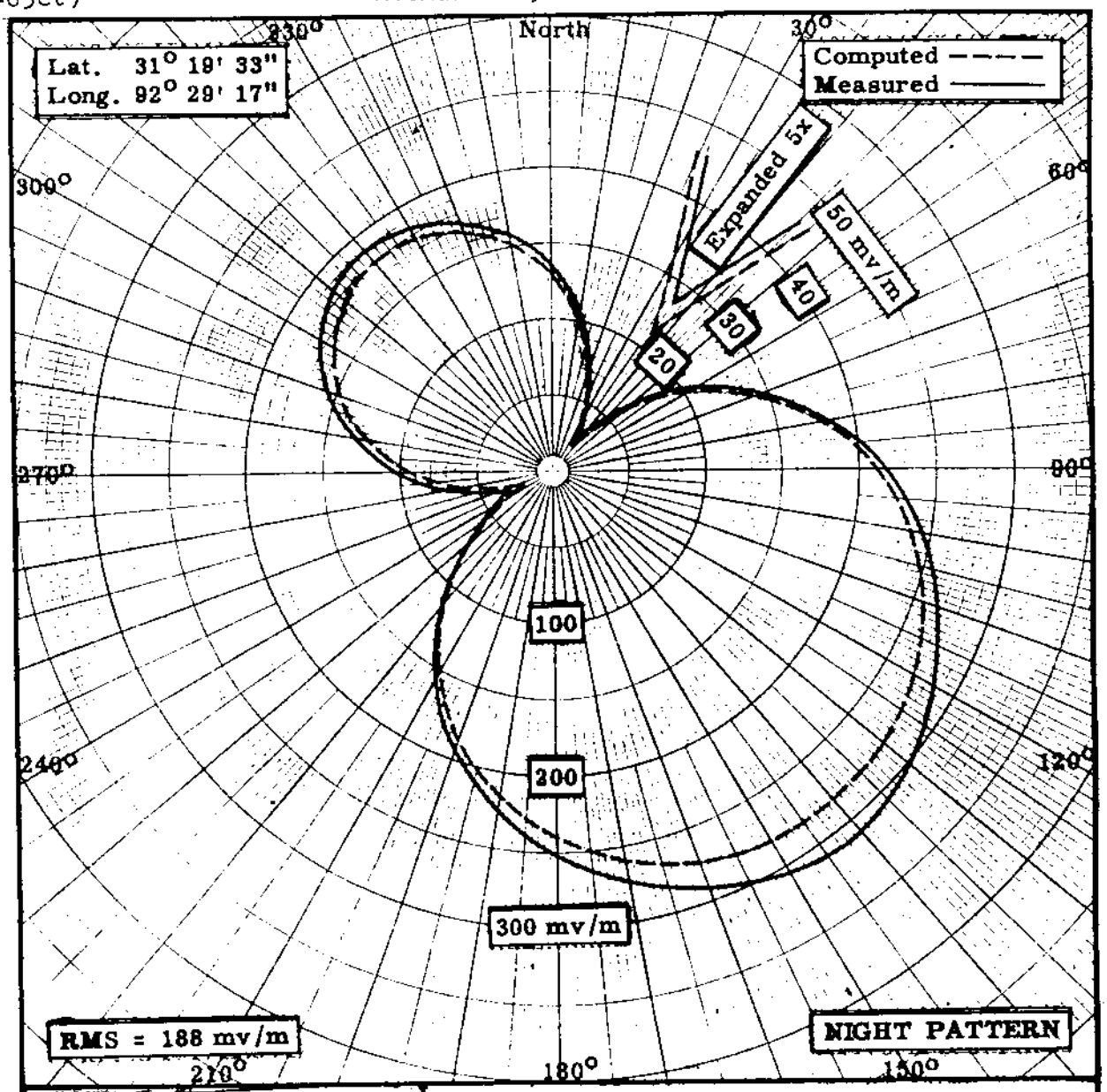
K P D R 3-22-48

KYSL

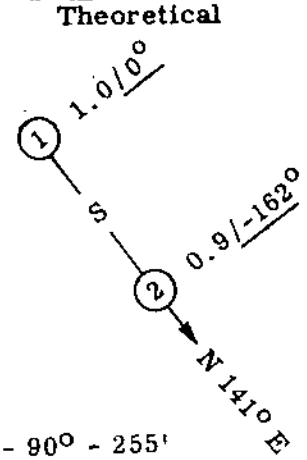
Measured Night
(3-30-63ct)

Station KSYL
Alexandria, Louisiana

1kw,DA-N,U
970 kc



Theoretical



G_1 - 90° - 255'
G_2 - 57° - 160'
S - 70° - 197.3'

RADIO STATION KSYL
ALEXANDRIA, LOUISIANA

MEASURED DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
970 KC 1000 WATTS

061362-3

FIGURE 3

MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS

FCC File No.BZ-4833
Accepted 2-21-63

Station KSYL
Alexandria, Louisiana

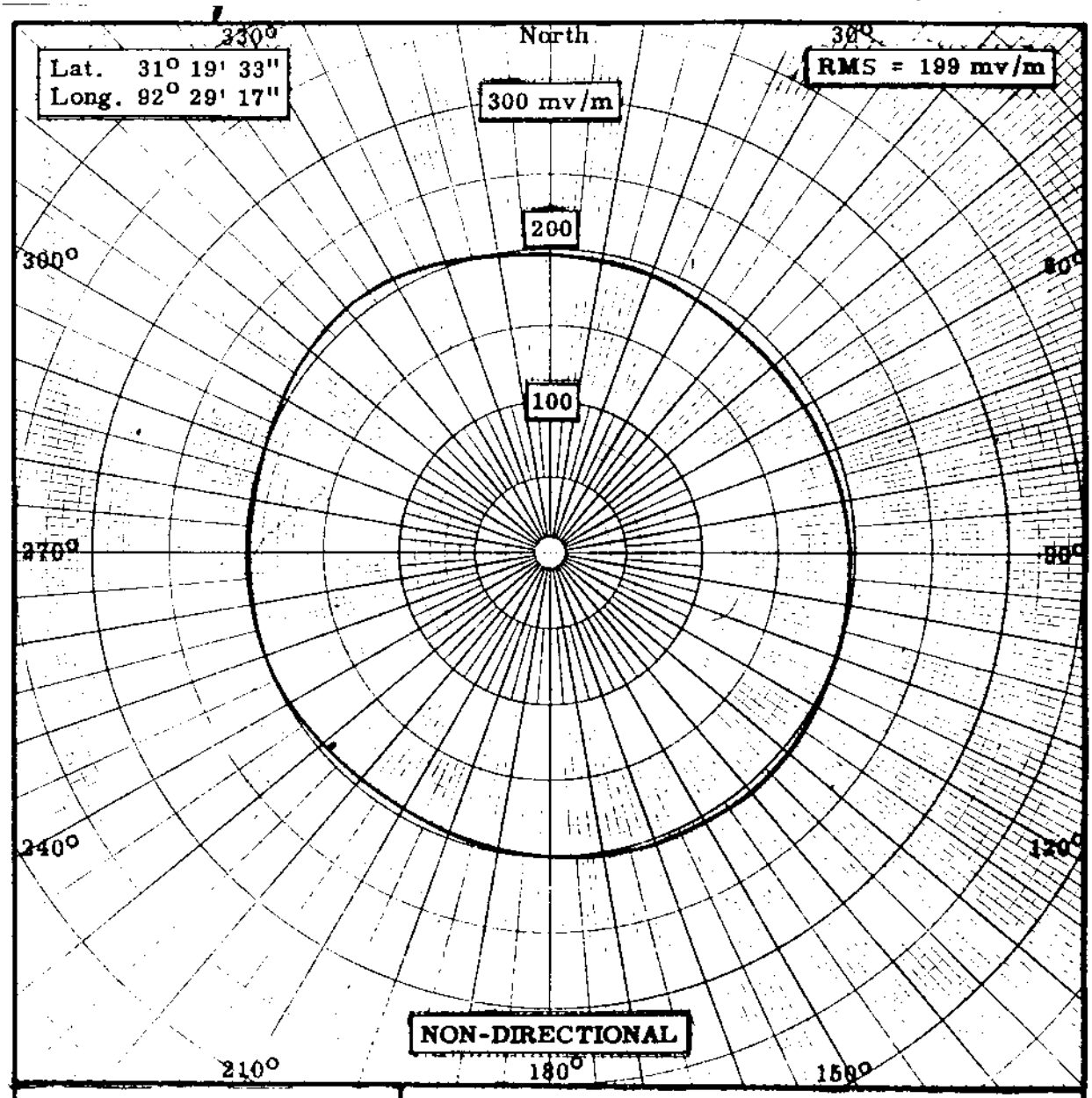
970 kc

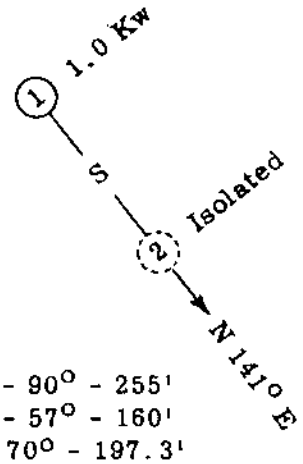
KYSL

Measured Non-DA
(3-30-63ct)

Station KSYL
Alexandria, Louisiana

1kw,DA-N,U
970 kc





G_1 - 90° - 255'
G_2 - 57° - 160'
S - 70° - 197.3'

RADIO STATION KSYL
ALEXANDRIA, LOUISIANA

MEASURED NON-DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
970 KC 1000 WATTS

061362-2

FIGURE 2

MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS

FCC File No.BZ-4833
Accepted 2-21-63

Station KSYL
Alexandria, Louisiana

970 kc

WAMD

ABERDEEN, Md.
WAMD

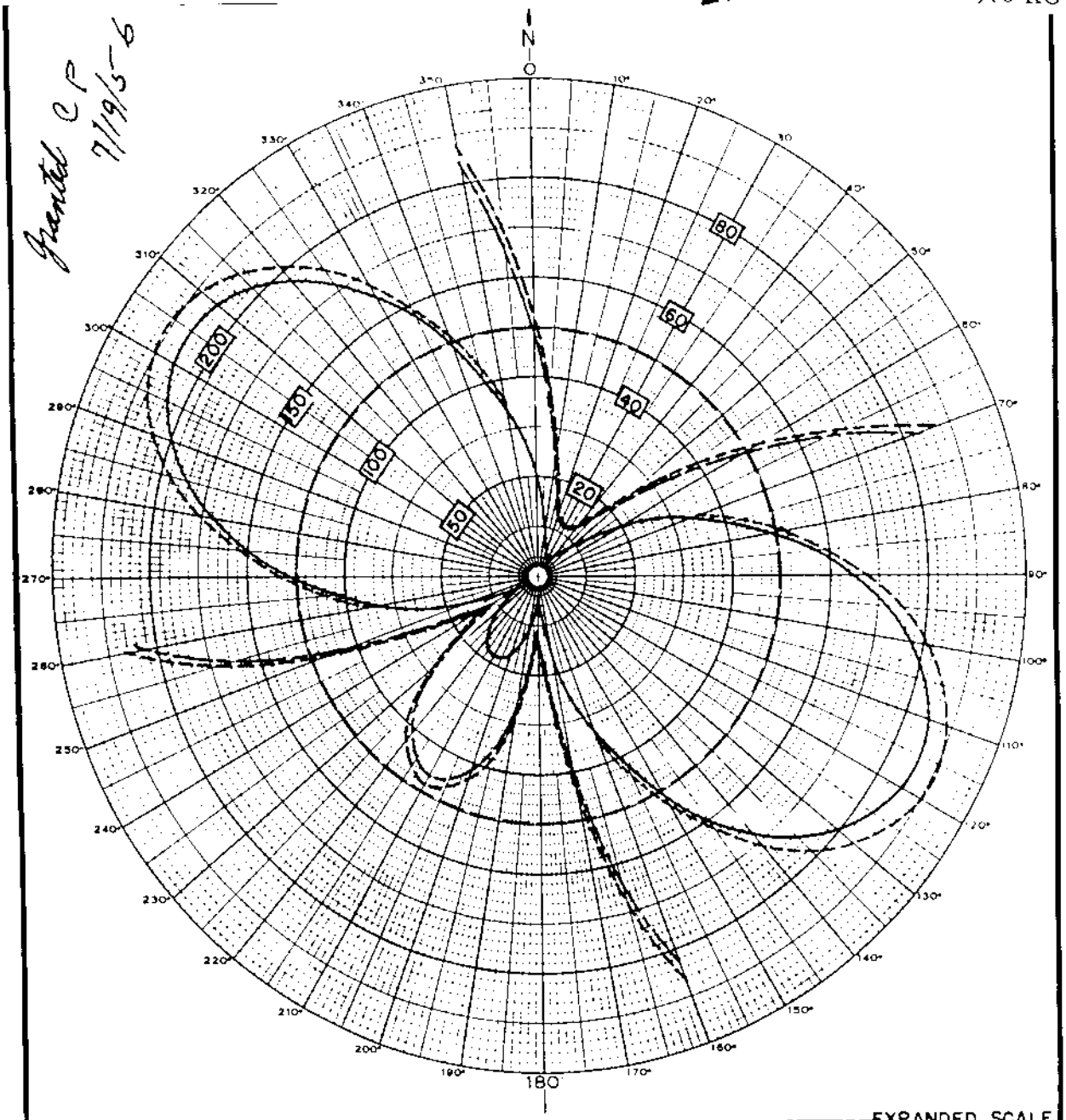
PROPOSED
DAY (6/11/56g)

HARFORD CO. B/C CO.
ABERDEEN, MD.

500 W
DA-D

970 KC

Granted CP 7/19/56



E_{RMS} = 124.5 MV/M

LATITUDE: 39° 30' 35"
LONGITUDE: 76° 11' 38.3"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

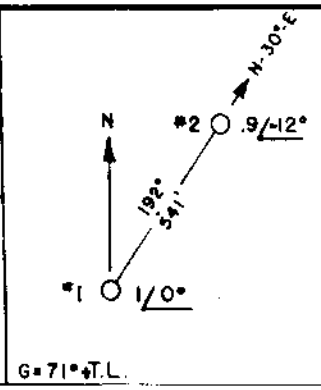


FIGURE 4

DAYTIME
HORIZONTAL POLAR PATTERN

HARFORD COUNTY B/C ING CO.

ABERDEEN, MARYLAND

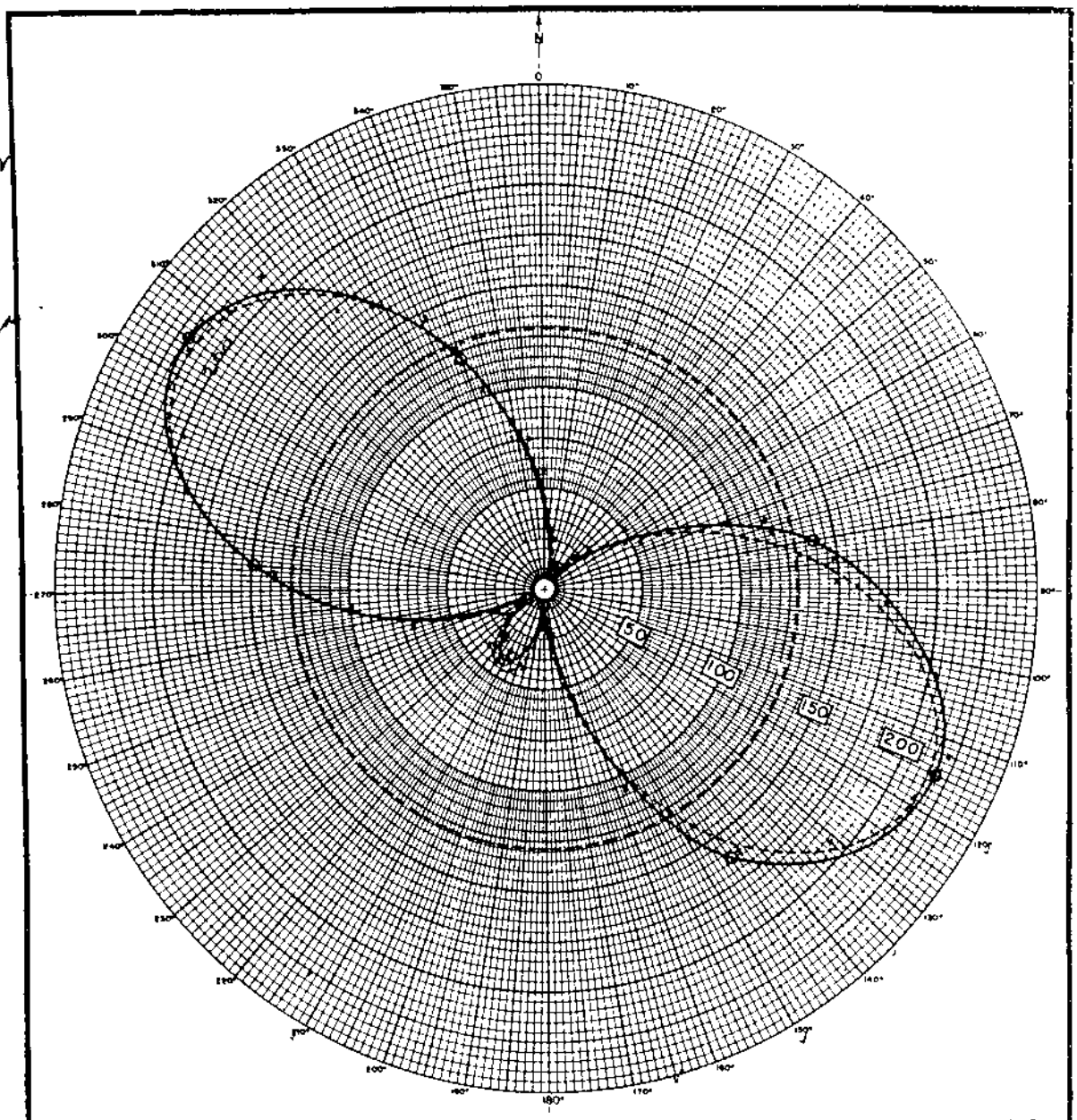
970 KC 0.5 KW DA-D

FCC File No. BP-10,090 (Amended) Accepted 6-5-56 Harford County B/C Co. Aberdeen, Md. 970 KC

WAMD

MEASURED DAY (5/17/57g) | Station WAMD Aberdeen, Maryland | 500w, DA-~~2~~D 970 KC

Granted license 10/1/57 BL-8947- granted L 4-5-62 change in hrs of operation DA-2 and change in DA. Sept



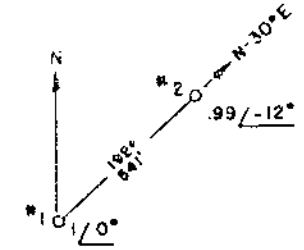
E_{RMS} = 128.5 MV/M

•••• MEASURED RADIALS
XXXX CROSS RADIALS
—— MEASURED PATTERN
---- CALCULATED PATTERN

LATITUDE: 39° 30' 35"
LONGITUDE: 76° 11' 38.3"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS



G = 72° PLUS T.L.

FIGURE 18

MEASURED DAYTIME HORIZONTAL POLAR PATTERN

RADIO STATION WAMD
ABERDEEN, MARYLAND

970 KC 0.5 KW-DA-D

FCC File No. BL-6623
Accepted 5/3/57g

WAMD
Aberdeen, Maryland 970 KC

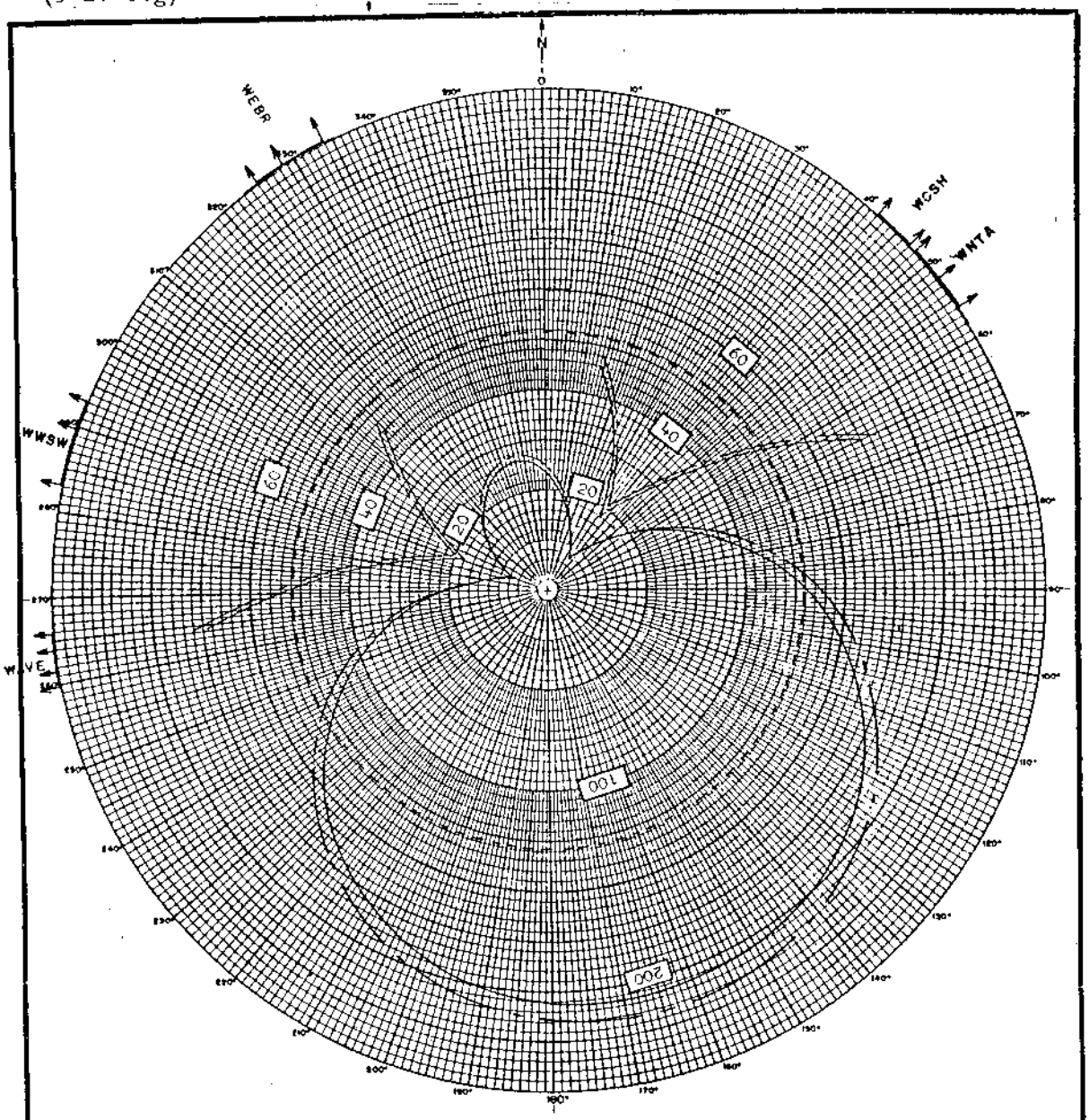
WAMD

PROPOSED NIGHT
(5-27-60g)

Station WAMD
Aberdeen, Maryland

500w, DA-2,U
970 KC

8-21-61 Mod of pt for DA-2 operation



E_{RMS} = 129 MV/M (BY ADJUSTMENT) _____ - _____ MEOV

LATITUDE: 39° 30' 35"
LONGITUDE: 76° 11' 38.3"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS

#2 1/0°
211.5'
75°
#3 0.85/-135°
164.5°
G-87.5°

FIGURE 4
(AMENDED)
HORIZONTAL POLAR PATTERN
(NIGHTTIME)
RADIO STATION WAMD
ABERDEEN, MD.

970 KC 0.5 KW, DA-2, U

FCC File No. BP-12529
Accepted 5-20-60 (Amended)

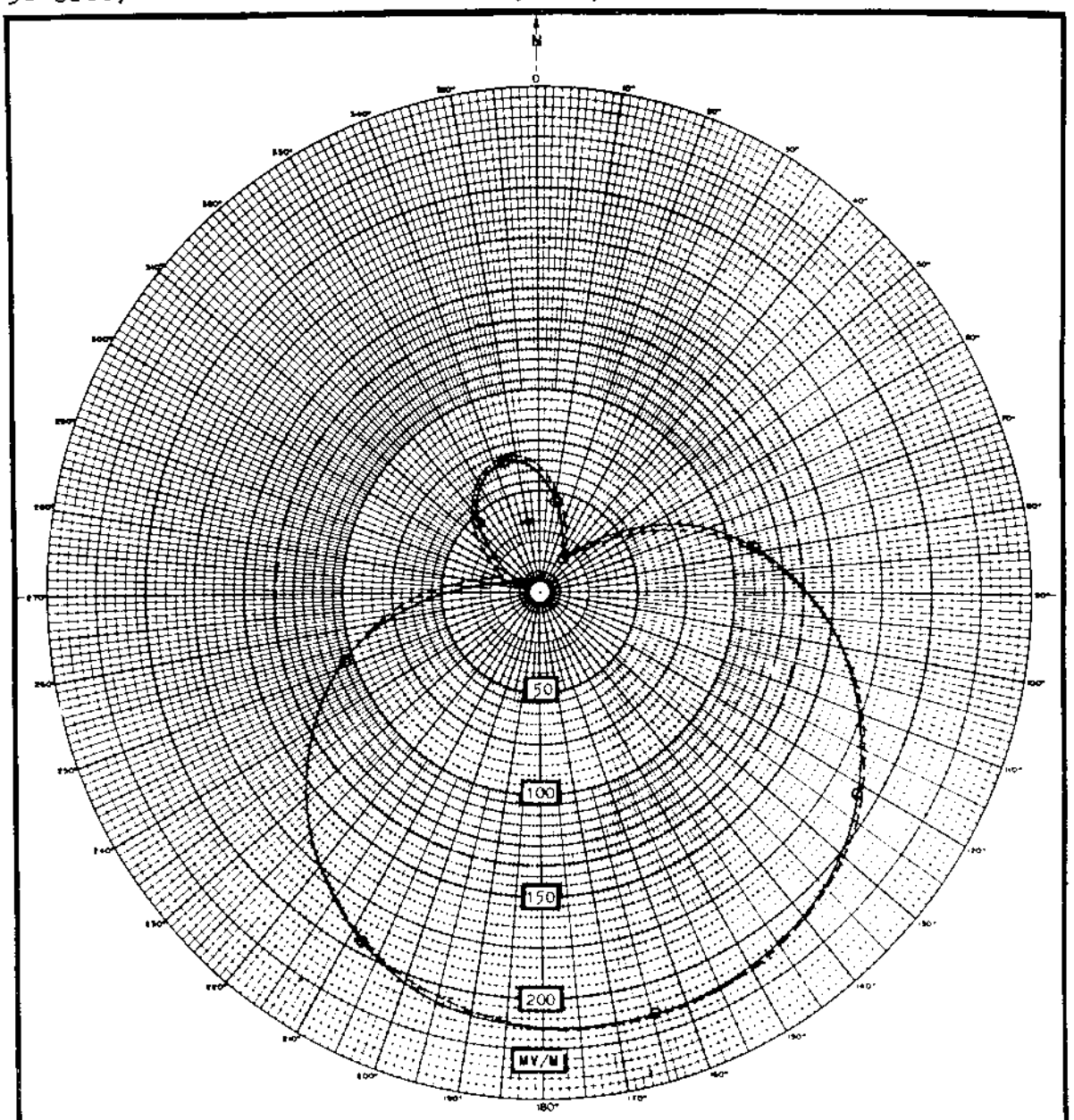
WAMD
Aberdeen, Maryland 970 KC

WAMD

Measured Night
(3-30-62ct)

Station WAMD
Aberdeen, Maryland

500w,DA-2,U
970 kc



E_{RMS} = 135 MV/M (MEASURED)

O = RADIAL VALUES
---- THEORETICAL
—— MEASURED

LATITUDE: 39° 30' 35"
LONGITUDE 76° 11' 38.3"

JOHN H. MULLANEY AND ASSOCIATES
WASHINGTON, D. C.

ANTENNA PARAMETERS

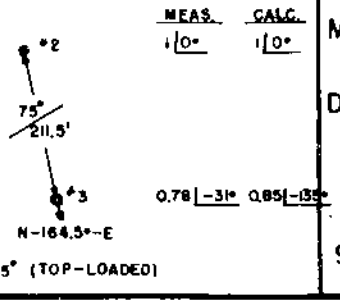


FIGURE 13

MEASURED HORIZONTAL (NIGHTTIME) DIRECTIONAL PATTERN

RADIO STATION WAMD
ABERDEEN, MARYLAND
970 KC 0.5 KW, DA-2

FCC File No.BL-8947
Accepted 3-13-62

Station WAMD
Aberdeen, Maryland

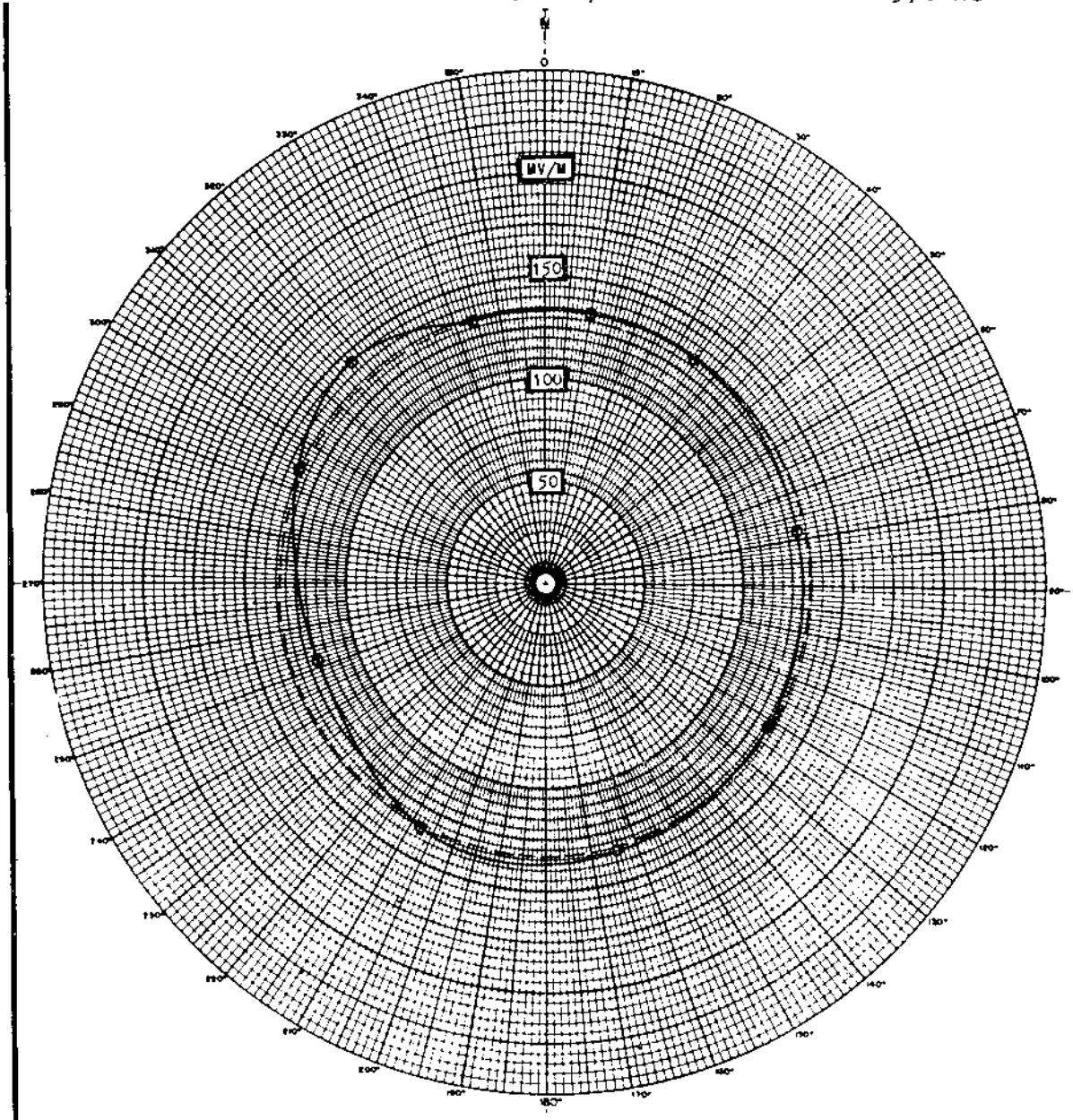
970 kc

WAMD

Measured Non-DA
(3-30-62ct)

Station WAMD
Aberdeen, Maryland

500w,DA-2,U
970 kc



E_{RMS} = 133 MV/M (MEASURED)

O = RADIAL VALUES

LATITUDE: 39° 30' 35"
LONGITUDE: 76° 11' 38.3"

JOHN H. MULLANEY AND ASSOCIATES
WASHINGTON, D. C.

ANTENNA PARAMETERS

#1 TOWER

G = 87.5° (TOP-LOADED)

FIGURE 12

MEASURED HORIZONTAL NON-DIRECTIONAL PATTERN

RADIO STATION WAMD
ABERDEEN, MARYLAND

970 KC 0.5 KW, DA-2

FCC File No.BL-8947
Accepted 3-13-62

Station WAMD
Aberdeen, Maryland

970 kc

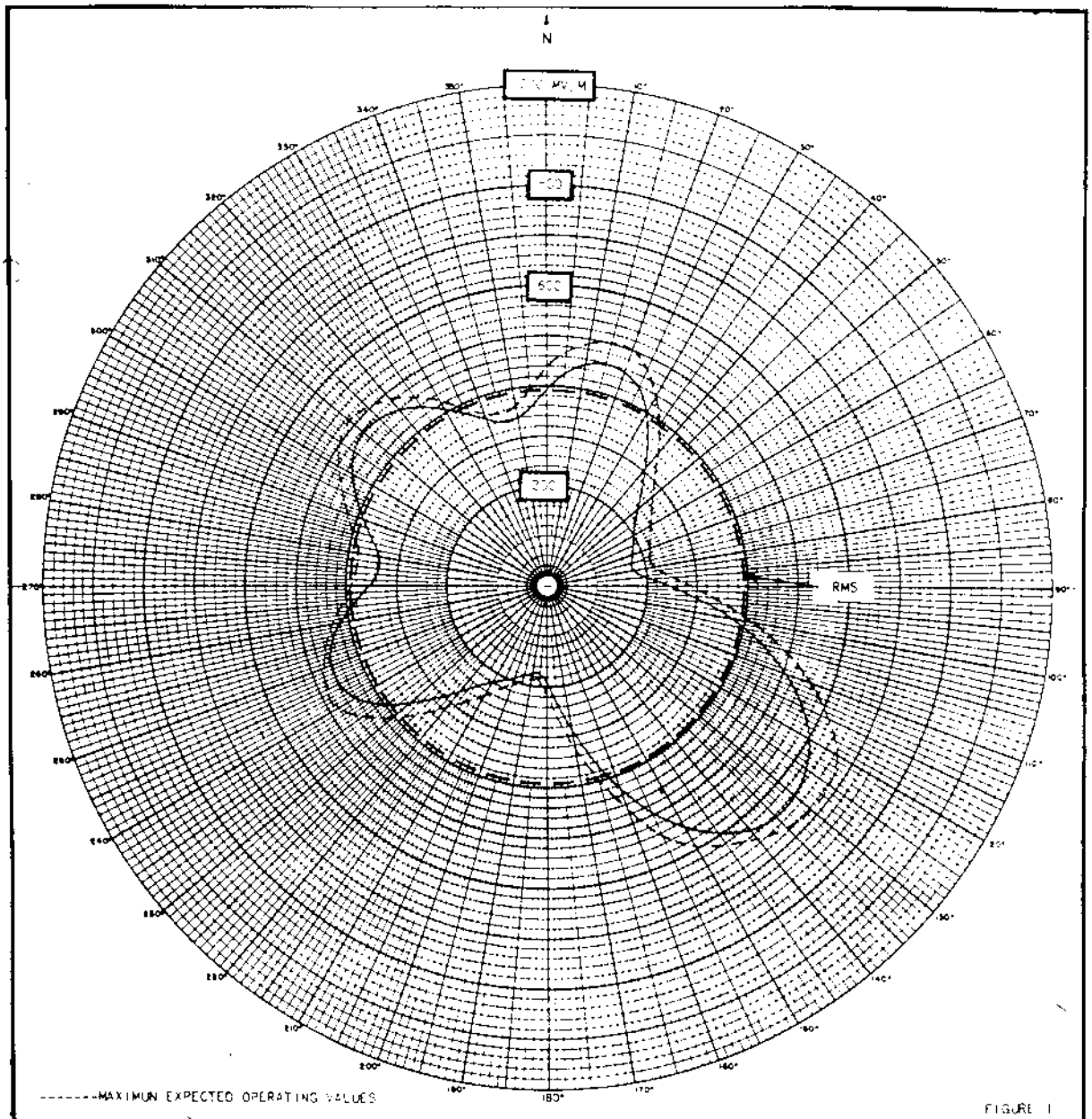
WANV

Proposed Day
(1-29-64ct)

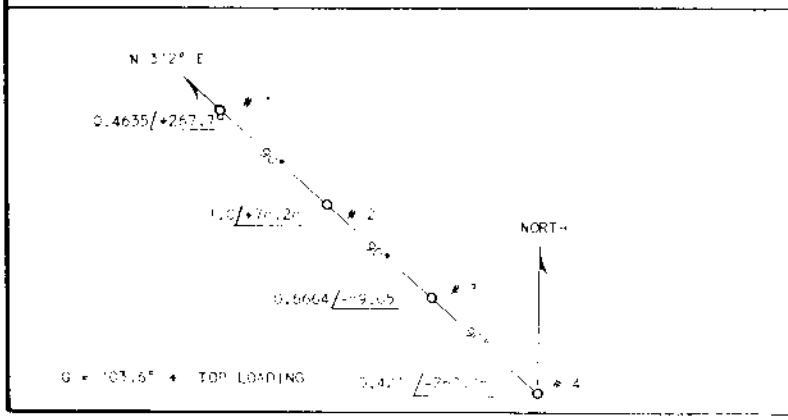
Station WBVA
Waynesboro, Virginia

1kw,5kw-LS,DA-2,U
970 kc

6/3/63
antenna chg
on .5-D to
.5-LS, DA-2



HORIZONTAL RADIATION PATTERN



APPLICANT	MUSIC PRODUCTIONS, INC.
LOCATION	WAYNESBORO, VIRGINIA
FREQUENCY	970 KC/S
POWER	[illegible] WATTS
LATITUDE	38 DEG 05 MIN 12 SEC
LONGITUDE	78 DEG 54 MIN 42 SEC
WHEN USED	DAYTIME
RMS FIELD	391.3 MV/M
DATE	OCTOBER 1961

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No.BMP-11115
Accepted 1-8-64

Station WBVA
Waynesboro, Virginia

970 kc

WANV

Proposed Night
(1-29-64ct)

Station WBVA
Waynesboro, Virginia

1kw,5kw-LS,DA-2,U
970 kc

6/3/03
posted chg
from -5-D to
-5-LS, DA-2, U.

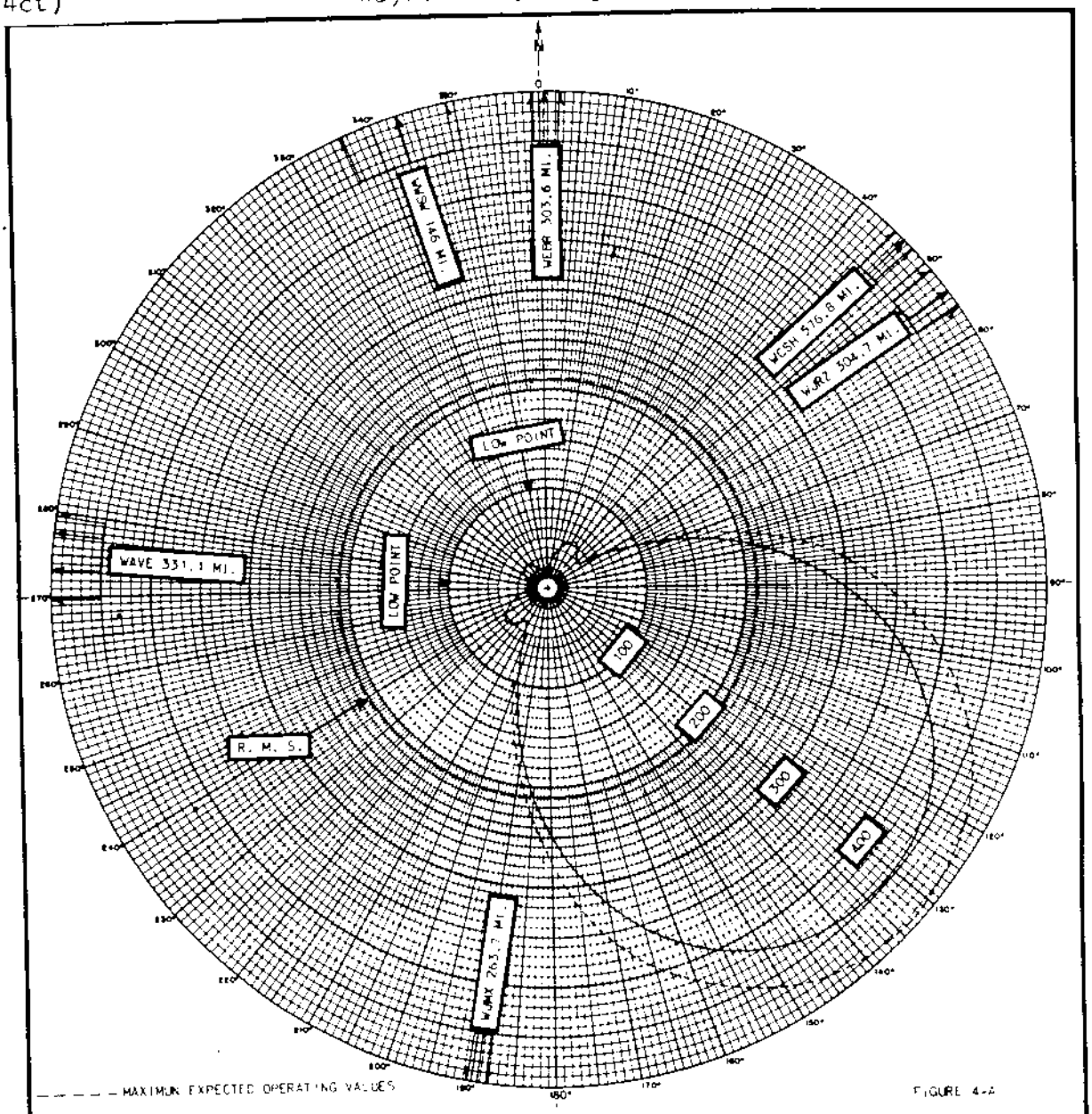
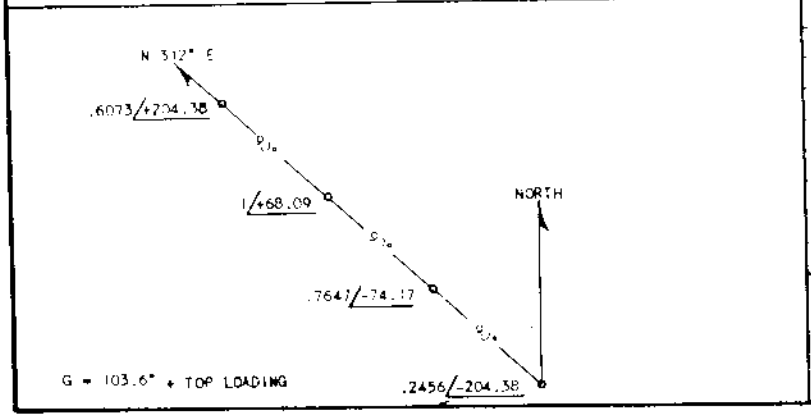


FIGURE 4-A

HORIZONTAL RADIATION PATTERN



APPLICANT	MUSIC PRODUCTIONS, INC.
LOCATION	WAYNESBORO, VIRGINIA
FREQUENCY	970 KC/S
POWER	1000 WATTS
LATITUDE	38 DEG 05 MIN. 12 SEC.
LONGITUDE	78 DEG 54 MIN 42 SEC.
WHEN USED	NIGHTTIME
R.M.S. FIELD	270.2 MV/M
DATE	OCTOBER 1963

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No.BMP-11115
Accepted 1-8-64

Station WBVA
Waynesboro, Virginia

970 kc

WANV

Proposed Night Nulls
(1-29-64ct)

Station WBVA
Waynesboro, Virginia

1kw,5kw-LS,DA-2,U
970 kc

6/3/63
posted chg
low-5-D to
1, 5-LS, DA-2.

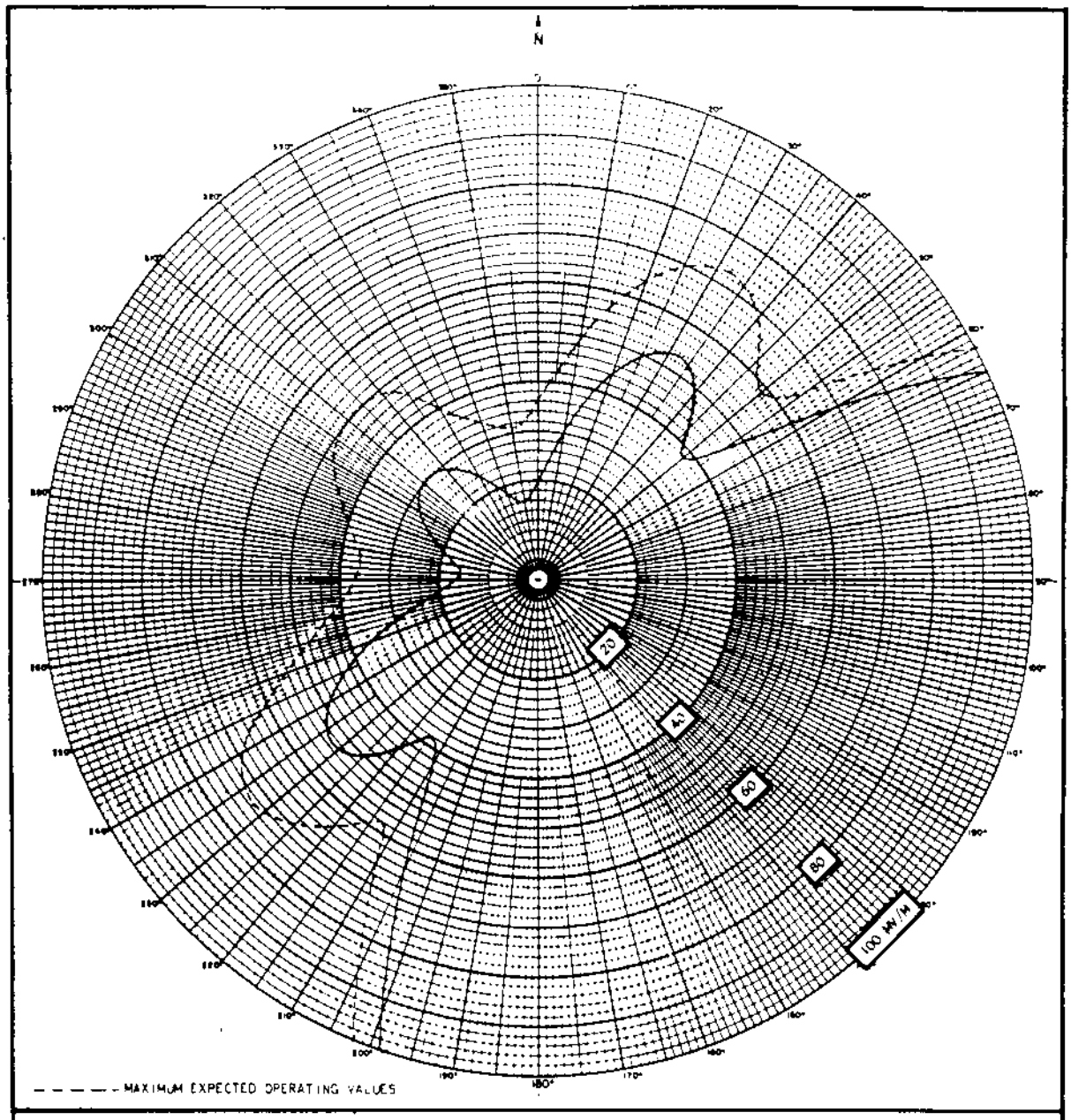


FIGURE 4-8

EXPANDED VIEW

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No.BMP-11115
Accepted 1-8-64

Station WBVA
Waynesboro, Virginia

970 kc

WANV

Measured Day
(5-27-65ct)

Station WANV
Waynesboro, Virginia

1kw,5kw-LS,DA-2,U
970 kc

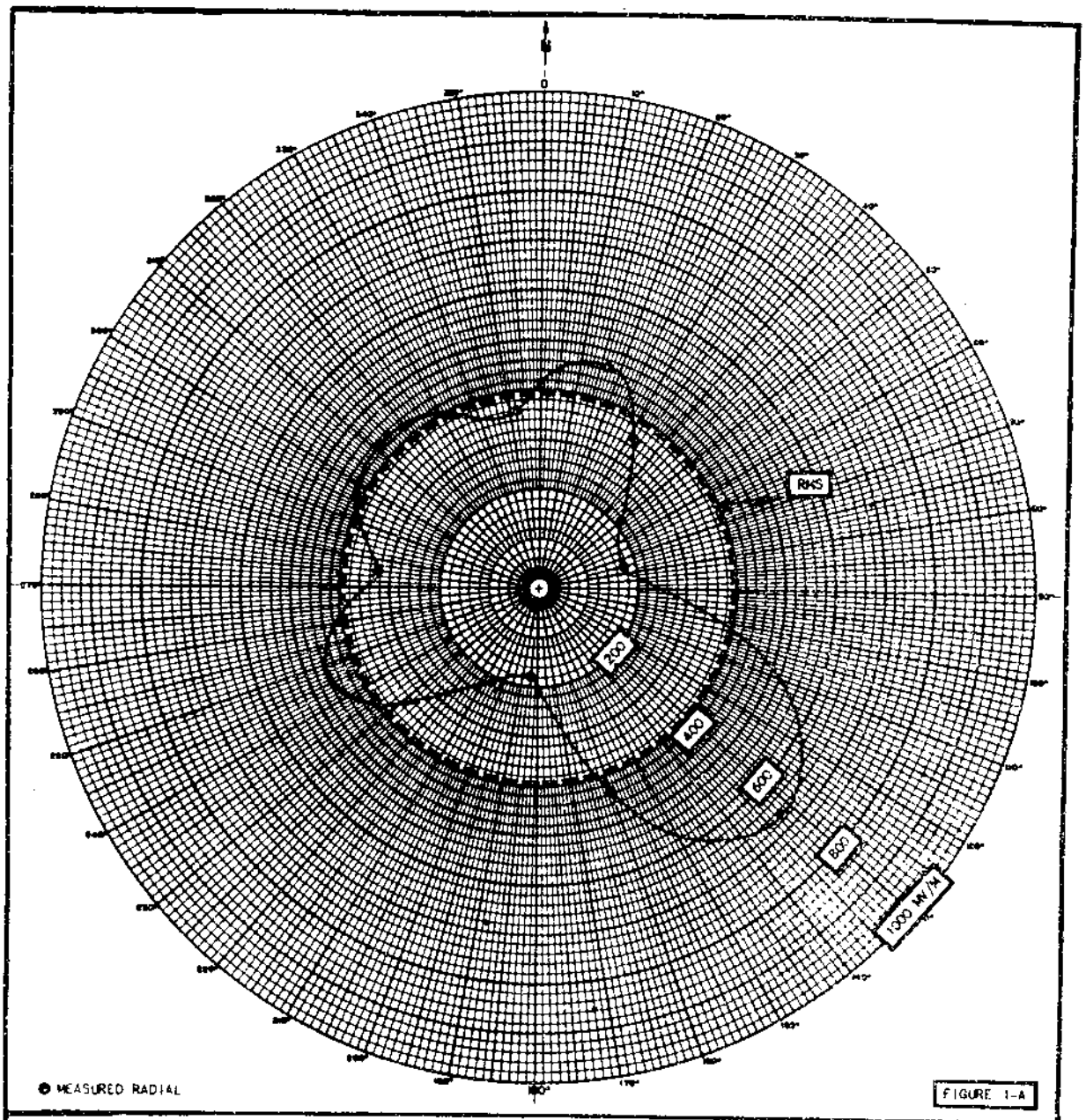
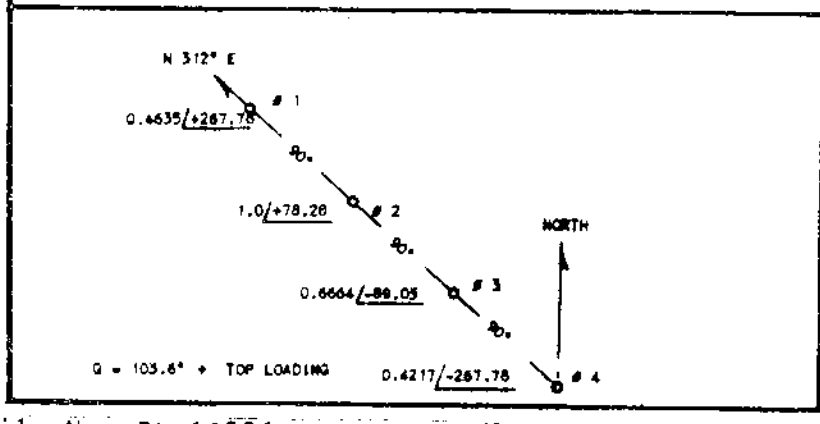


FIGURE 1-A

HORIZONTAL RADIATION PATTERN



APPLICANT	HUSIC PRODUCTIONS, INC.
LOCATION	WAYNESBORO, VIRGINIA
FREQUENCY	970 KC/S
POWER	5000 WATTS
LATITUDE	38 DEG. 05 MIN. 12 SEC.
LONGITUDE	78 DEG. 54 MIN. 42 SEC.
TIME USED	DAYTIME
R.M.S. FIELD	393 MV/M (MEASURED)
DATE	FEBRUARY 1965

GILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-10886
Accepted 4-29-65

Station WANV
Waynesboro, Virginia

970 kc

WANV

Measured Night
(5-27-65ct)

Station WANV
Waynesboro, Virginia

1kw,5kw-LS,DA-2,U
970 kc

LIC. 5-27-65

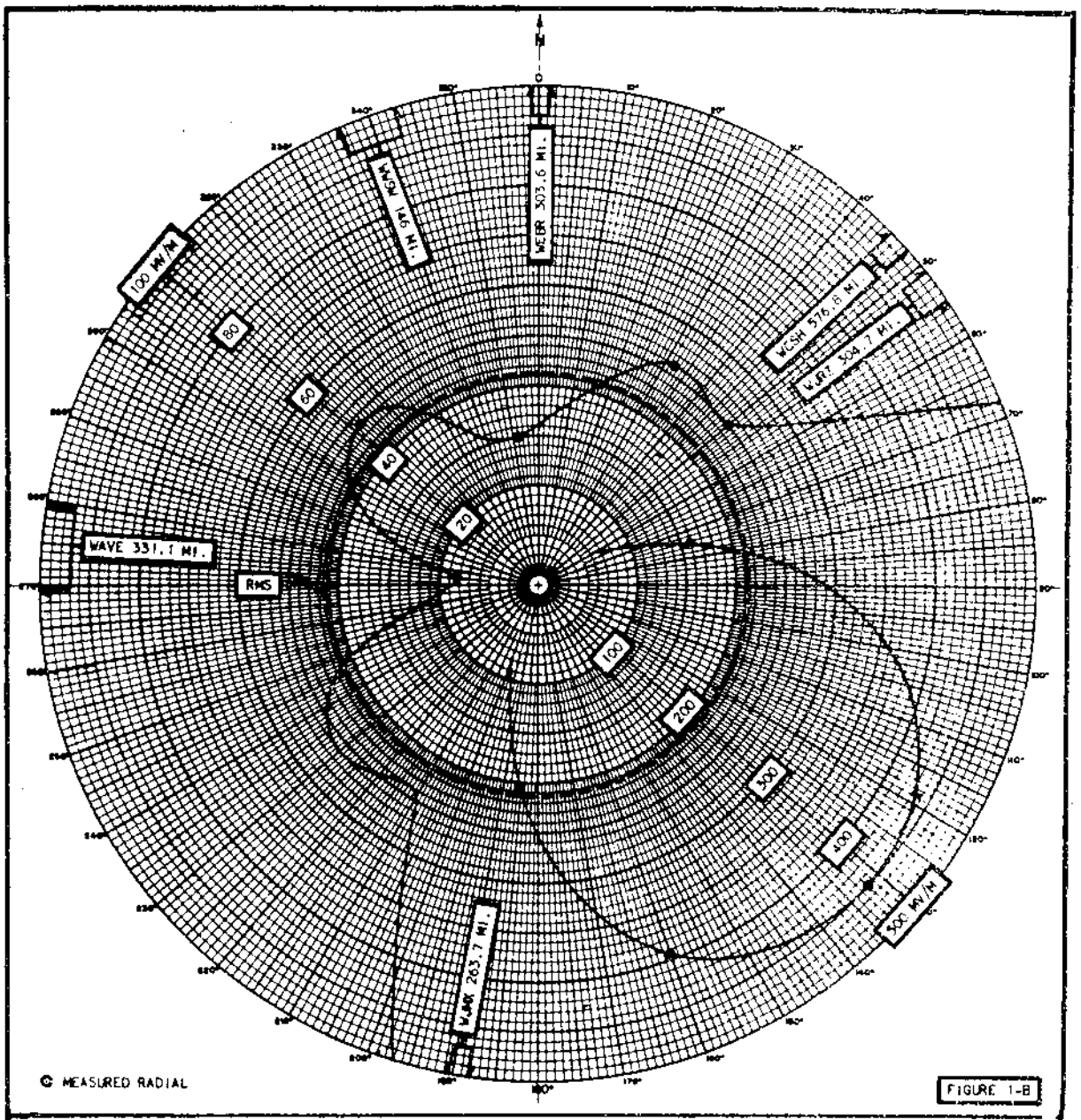
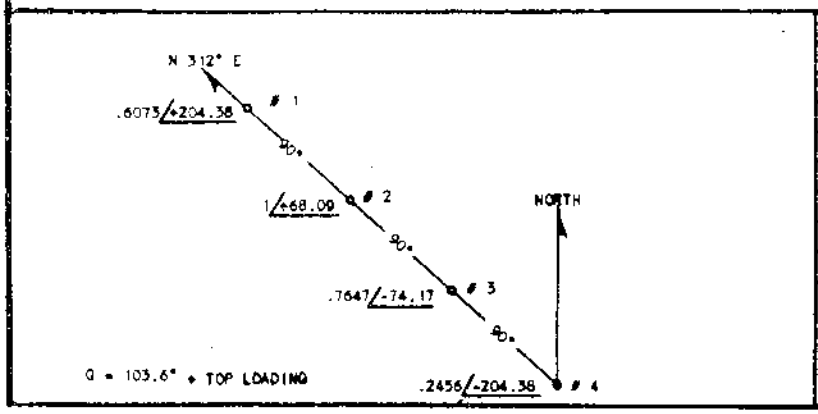


FIGURE 1-B

HORIZONTAL RADIATION PATTERN



APPLICANT	MUSIC PRODUCTIONS, INC.
LOCATION	WAYNESBORO, VIRGINIA
FREQUENCY	970 KC/S
POWER	1000 WATTS
LATITUDE	38 DEG. 05 MIN. 12 SEC.
LONGITUDE	78 DEG. 54 MIN. 42 SEC.
WHEN USED	NIGHTTIME
R.M.S. FIELD	212 MV/M (MEASURED)
DATE	FEBRUARY 1965

BILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-10886
Accepted 4-29-65

Station WANV
Waynesboro, Virginia

970 kc

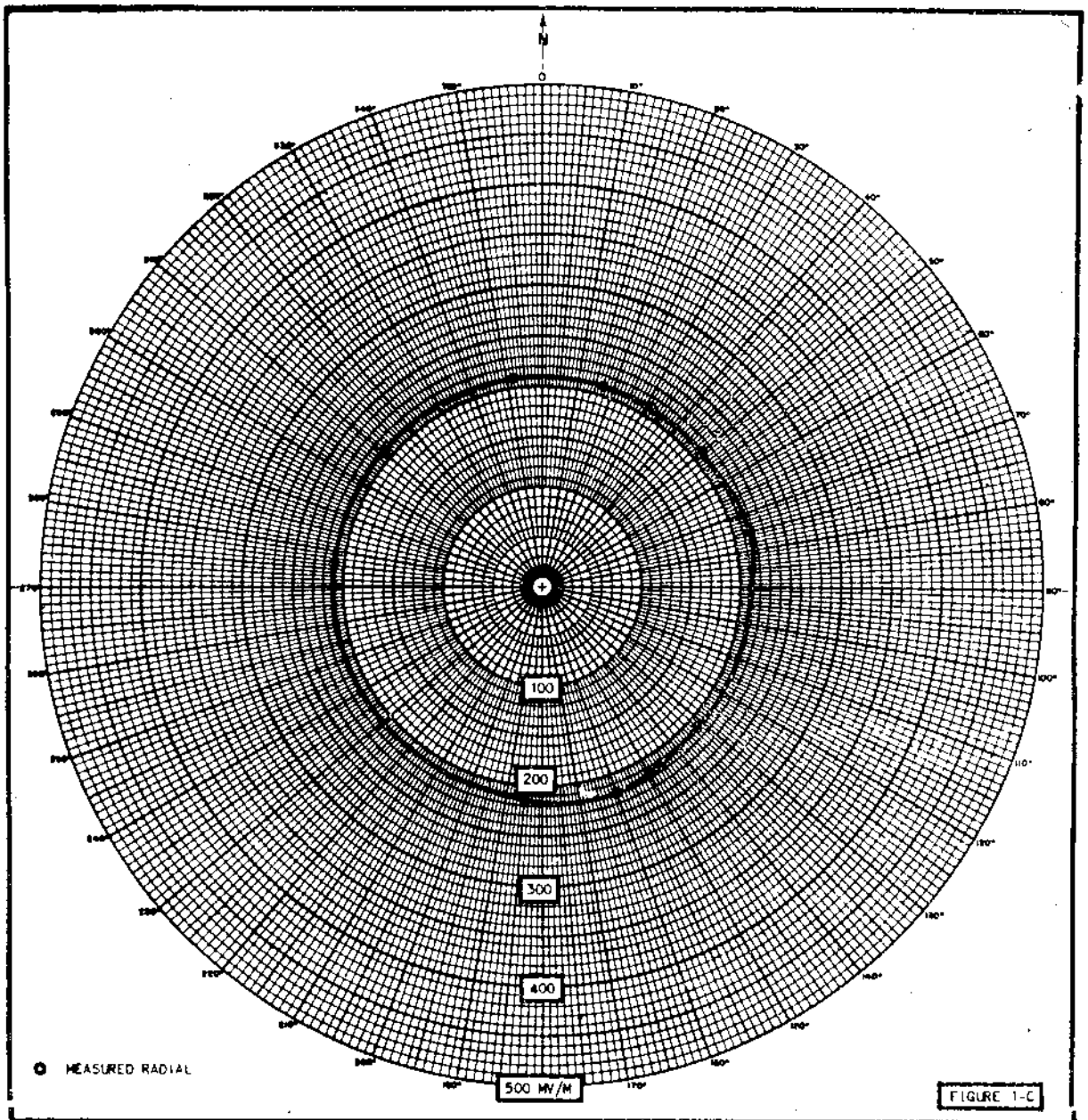
WANV

Measured Non-DA
(5-27-65ct)

Station WANV
Waynesboro, Virginia

1kw,5kw-LS,DA-2,U
970 kc

Lic. 5-27-65



HORIZONTAL RADIATION PATTERN

NON - DIRECTIONAL SURVEY

APPLICANT	MUSIC PRODUCTIONS, INC.
LOCATION	WAYNESBORO, VIRGINIA
FREQUENCY	970 KC/S
POWER	1000 WATTS
LATITUDE	38 DEG 05 MIN. 12 SEC.
LONGITUDE	78 DEG 54 MIN. 42 SEC.
WHEN USED	NON-DIRECTIONAL SURVEY
R.M.S. FIELD	212 MV/M (MEASURED)
DATE	FEBRUARY 1965

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-10886
Accepted 4-29-65

Station WANV
Waynesboro, Virginia

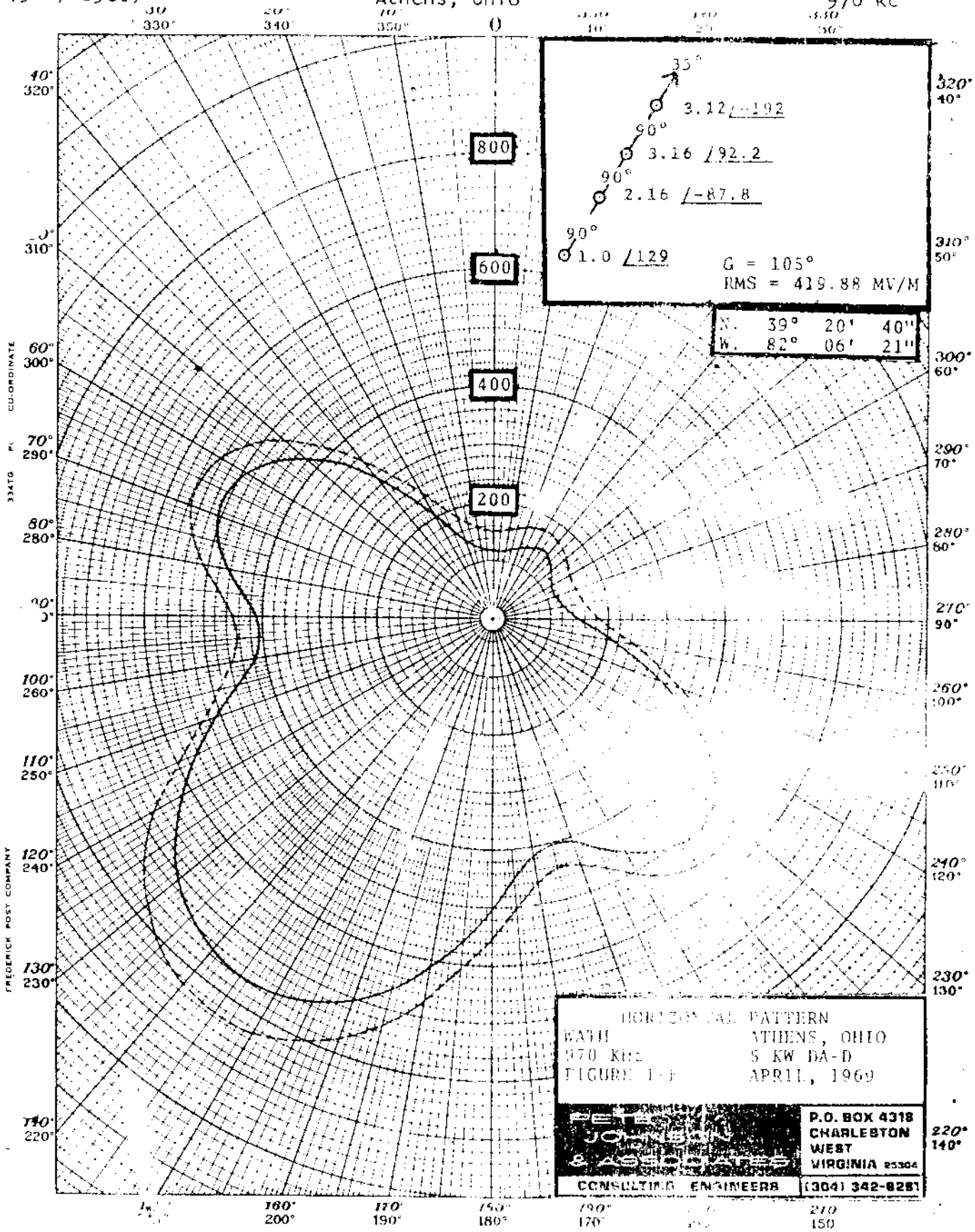
970 kc

WATH

Proposed Day
(5-27-69ct)

Station WATH
Athens, Ohio

5kw,DA-D,D
970 kc



FCC File No.BP-18285
Accepted 5-16-69 Amended

Station WATH
Athens, Ohio

970 kc

WAVE

PROPOSED DAY
(5-8-61g)

Station WAVE
Louisville, Kentucky

5kw, DA-2,U
970 KC

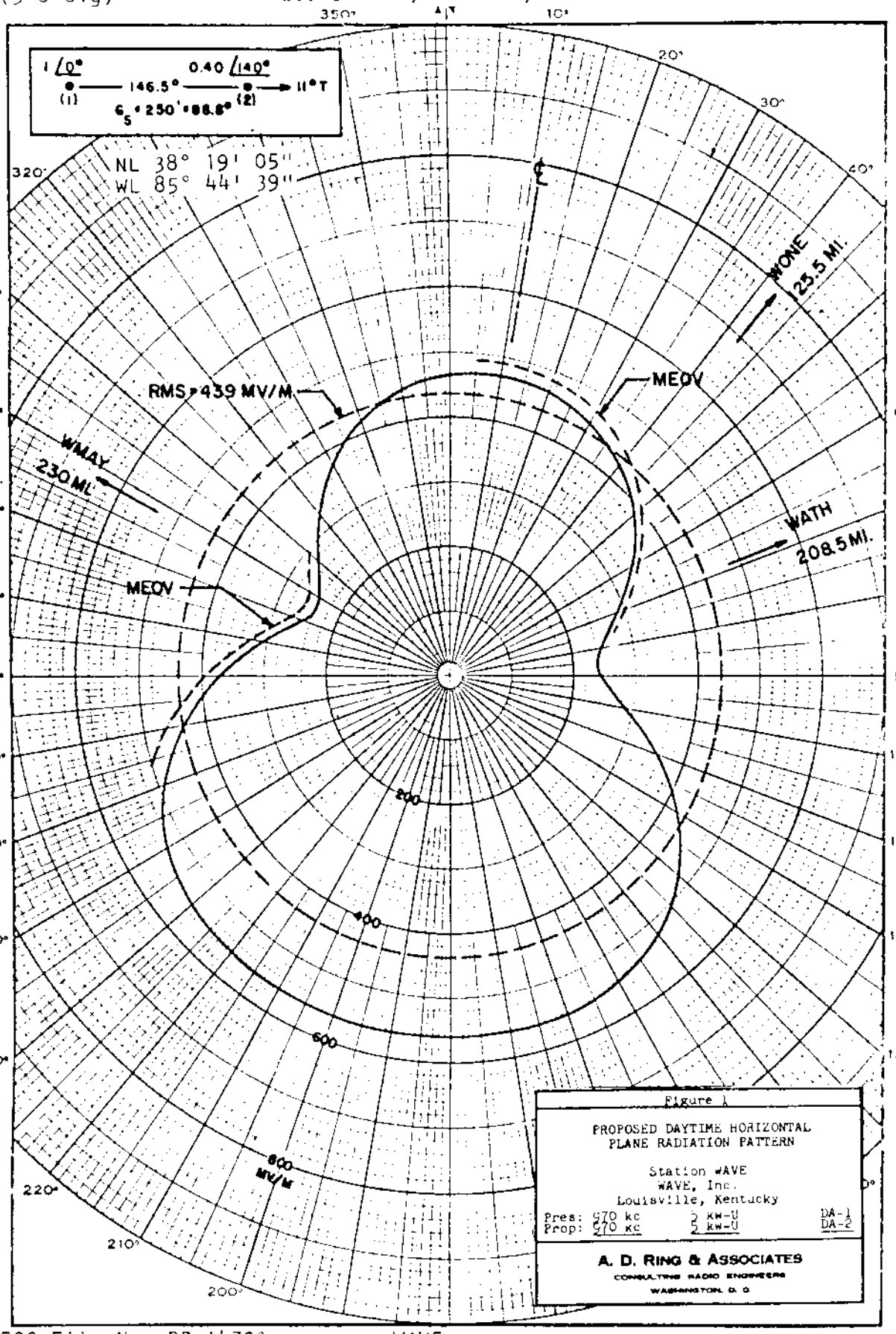


Figure 1

PROPOSED DAYTIME HORIZONTAL
PLANE RADIATION PATTERN

Station WAVE
WAVE, Inc.
Louisville, Kentucky

Pres:	970 kc	5 kw-U	DA-1
Prop:	970 kc	5 kw-U	DA-2

A. D. RING & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

A. D. RING & ASSOCIATES - 10/60 - M

FCC File No. BP-14723
Accepted 4-13-61

WAVE
Louisville, Kentucky

970 KC

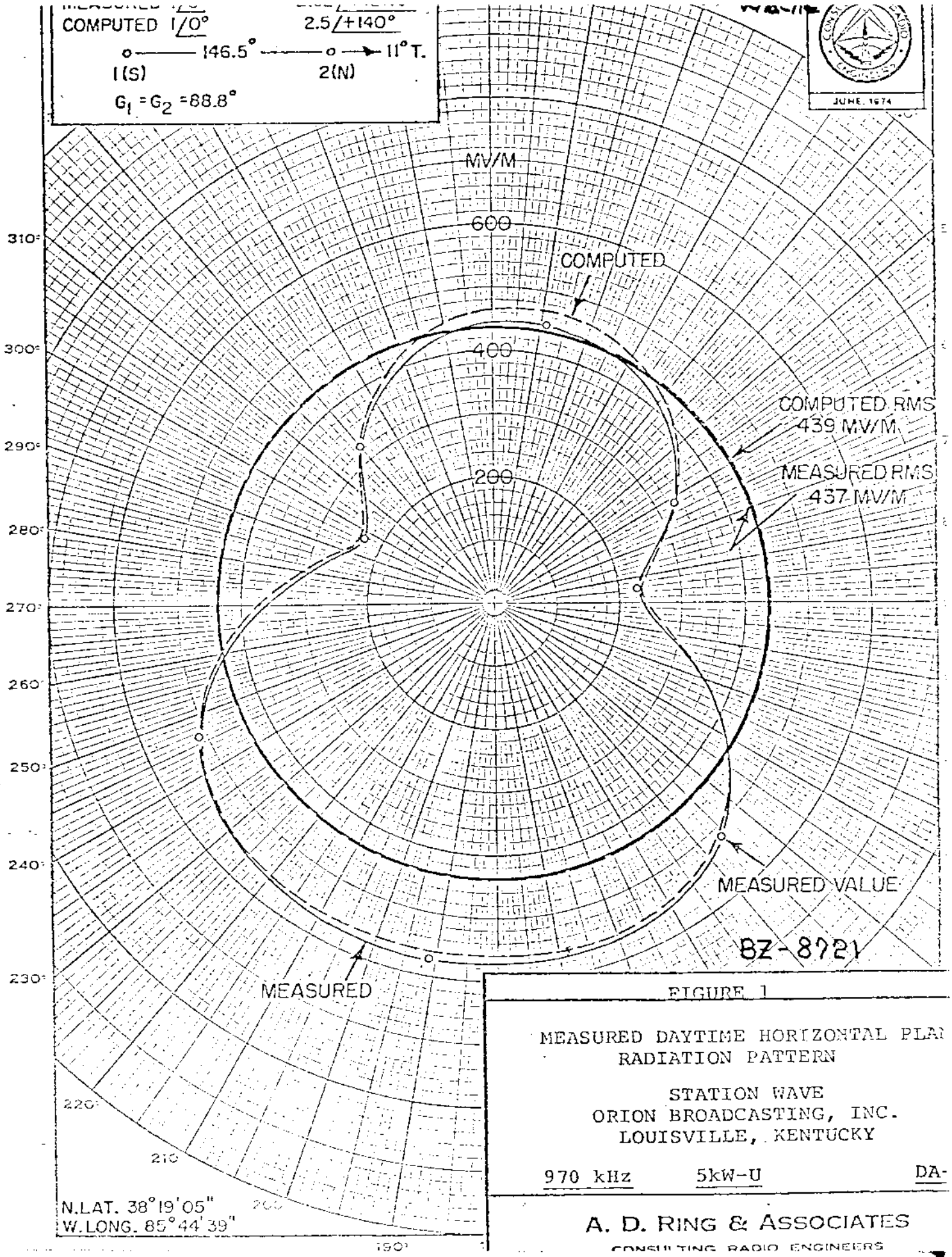


FIGURE 1

MEASURED DAYTIME HORIZONTAL PLAN
RADIATION PATTERN

STATION WAVE
ORION BROADCASTING, INC.
LOUISVILLE, KENTUCKY

970 kHz 5kW-U DA-

A. D. RING & ASSOCIATES
CONSULTING RADIO ENGINEERS

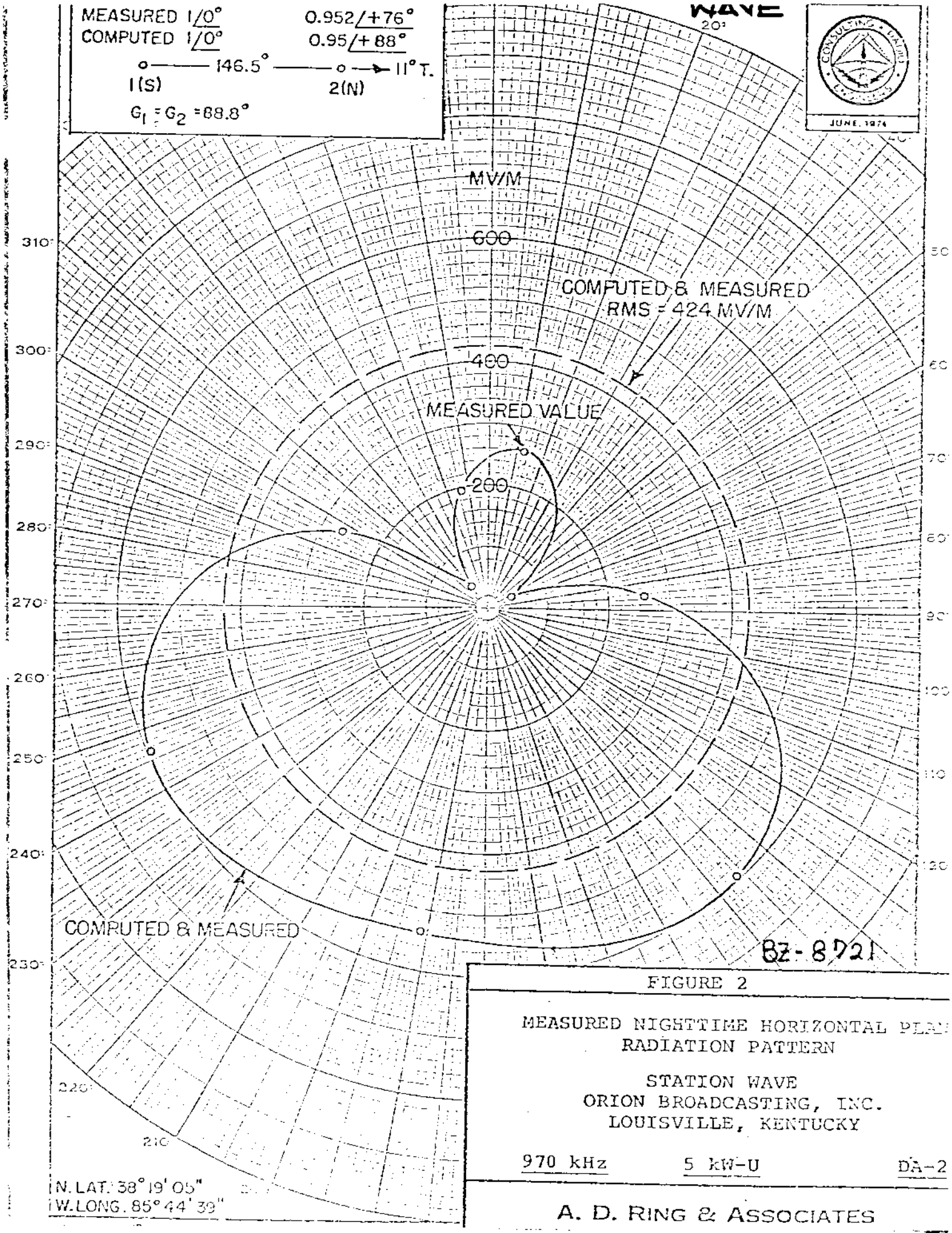


FIGURE 2

MEASURED NIGHTTIME HORIZONTAL PLANE
RADIATION PATTERN

STATION WAVE
ORION BROADCASTING, INC.
LOUISVILLE, KENTUCKY

970 kHz 5 kW-U DA-2

A. D. RING & ASSOCIATES

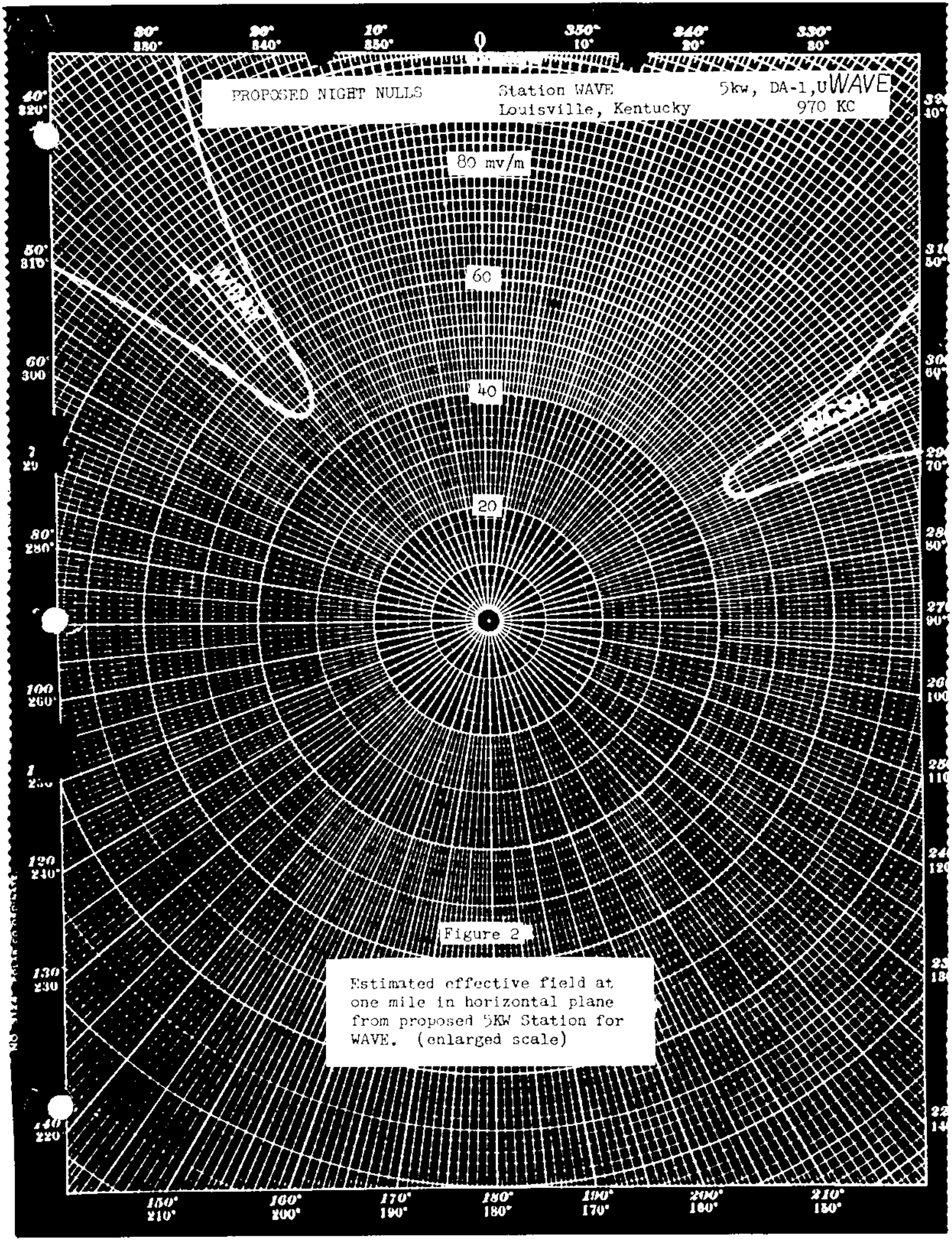
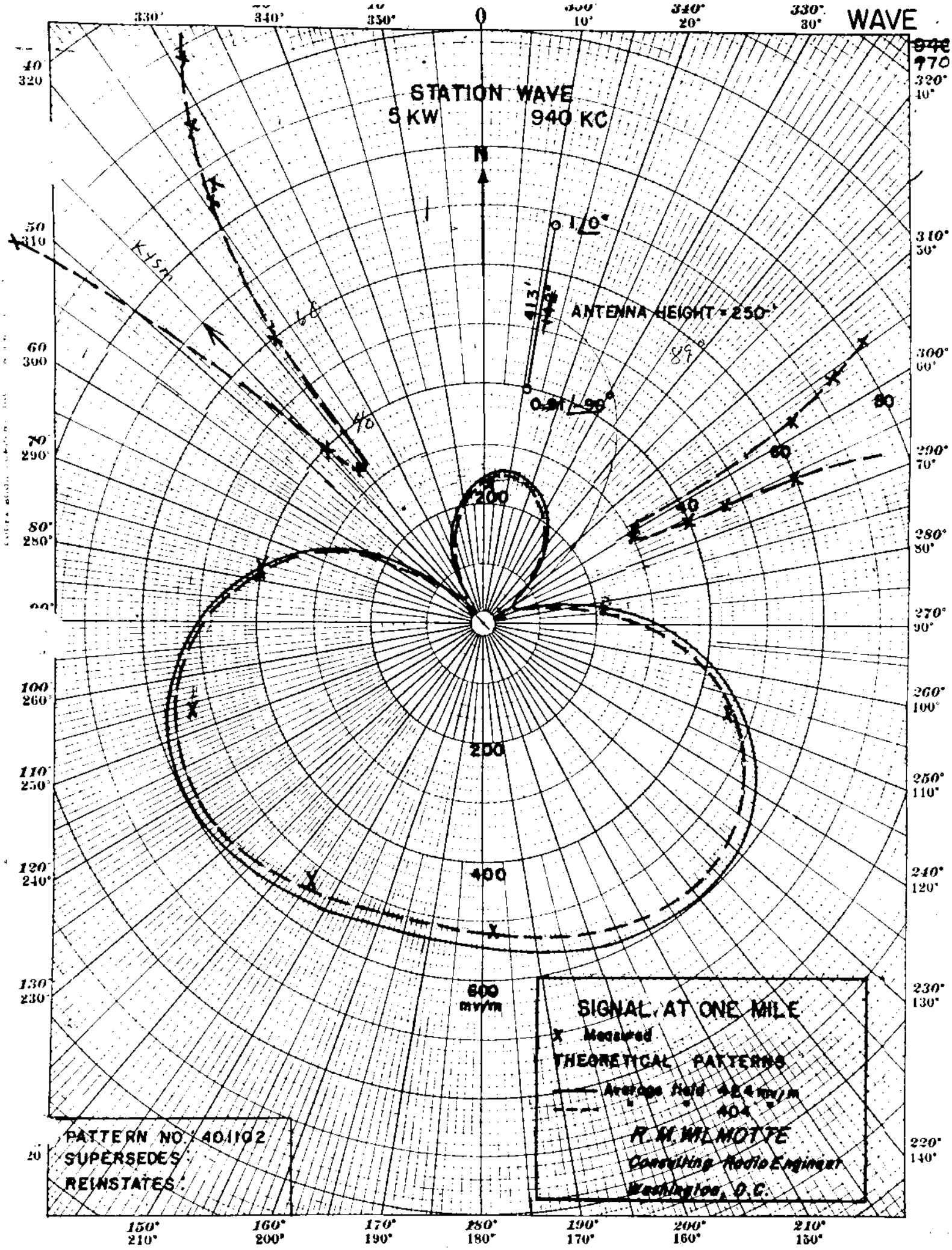


Figure 2

Estimated effective field at one mile in horizontal plane from proposed 5KW Station for WAVE. (enlarged scale)


WAVE
940
770
STATION WAVE
5 KW
940 KC
N
1∠0°
413'
ANTENNA HEIGHT = 250'
0.91∠-99°
200
400
600
mv/m
SIGNAL AT ONE MILE
Measured
THEORETICAL PATTERNS
Average field 424 mv/m
404
R. M. WILMOTTE
Consulting Radio Engineer
Washington, D.C.
PATTERN NO. 40.1102
SUPERSEDES
REINSTATES

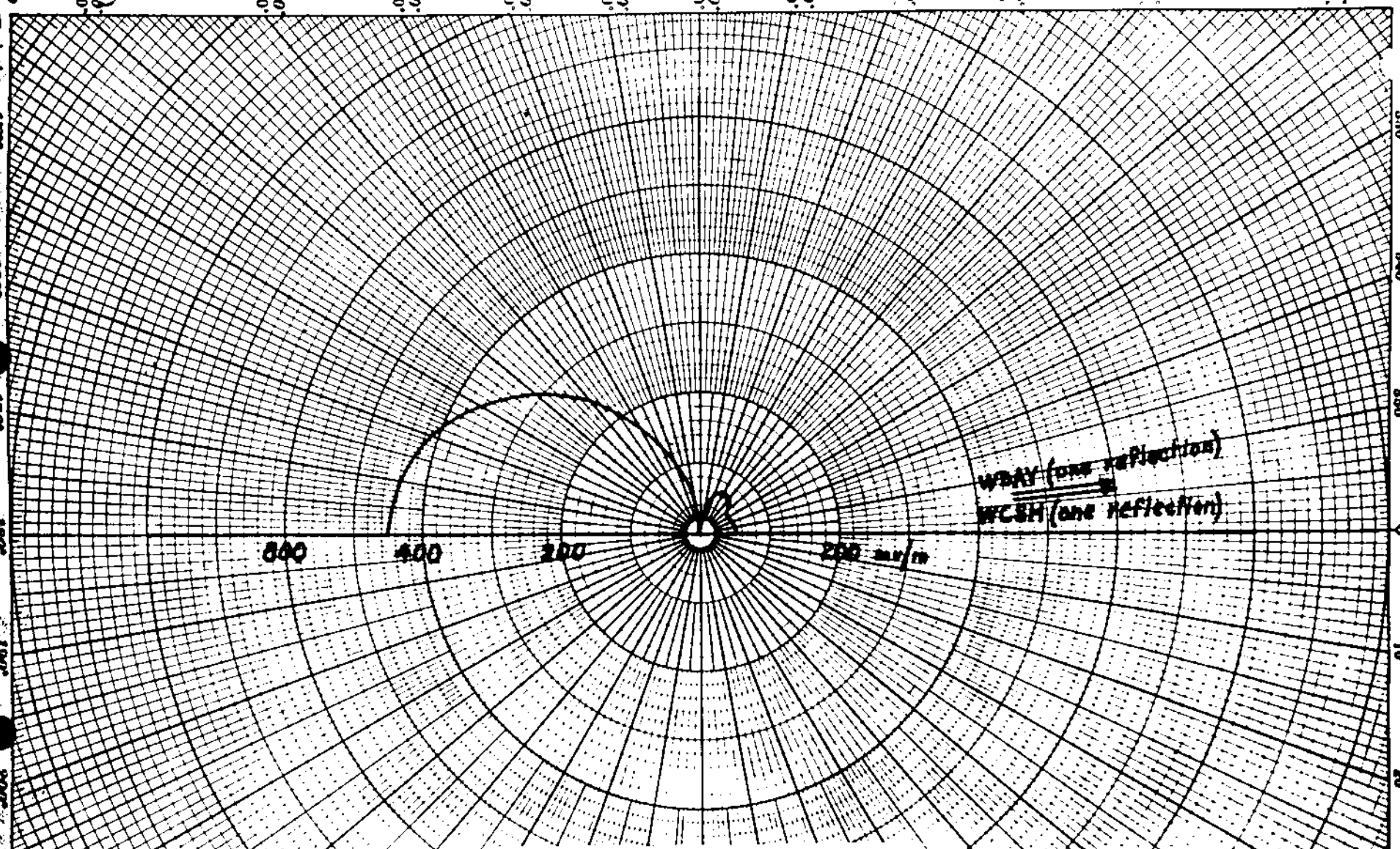


Fig. 4

Estimated unattenuated field at one mile in the vertical plane in the direction of WDAY and WCSH (51° from the line of radiators) for proposed 5 KW [illegible]ion at WAVE.

WAVE

Measured Non-DA
(3-30-63ct)

Station WAVE
Louisville, Kentucky

5kw,DA-2,U
970 kc
WAVE 970 KC

1-26-63 granted license covering change from DA-1 to DA-2

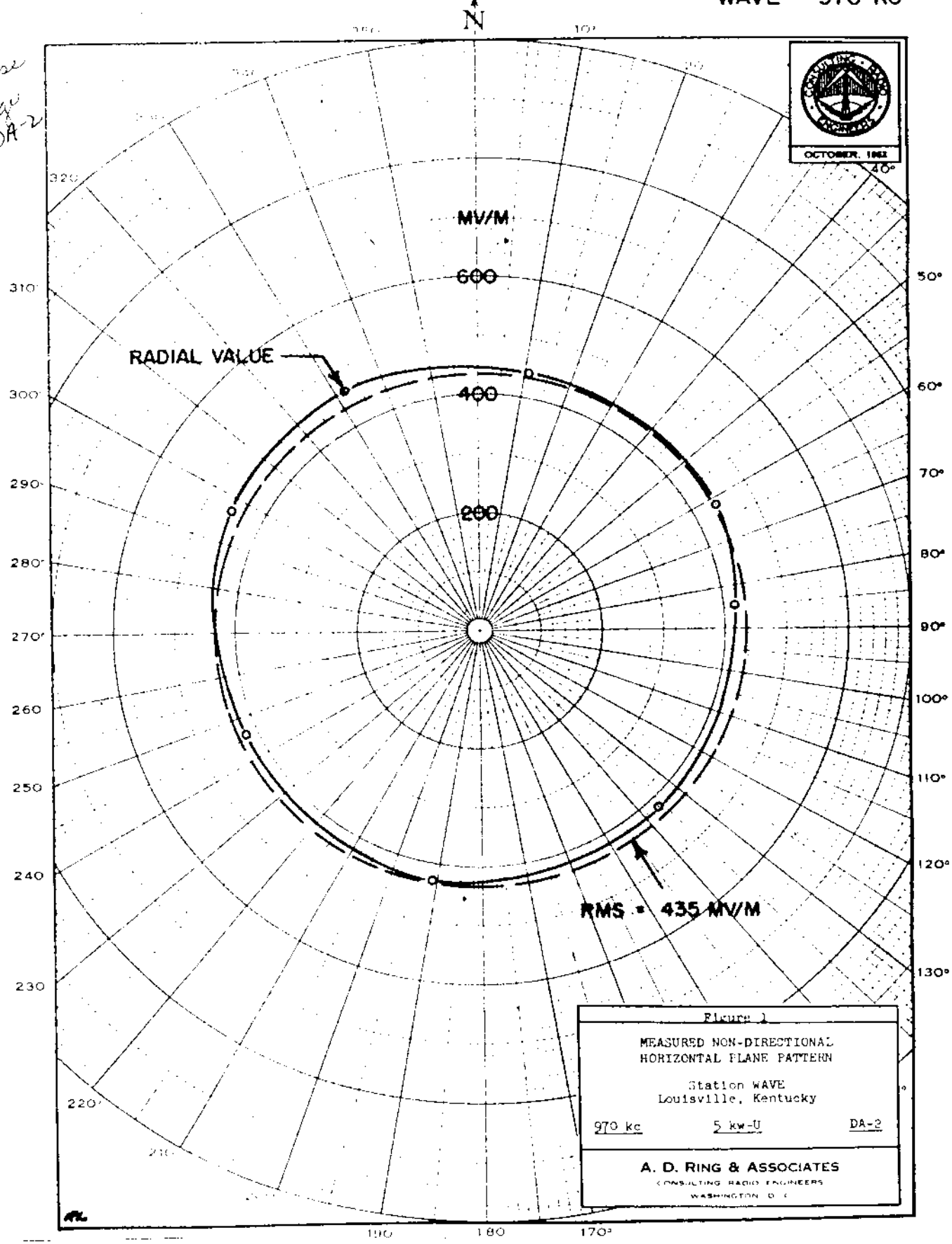


Figure 1

MEASURED NON-DIRECTIONAL
HORIZONTAL PLANE PATTERN

Station WAVE
Louisville, Kentucky

970 kc | 5 kw-U | DA-2

A. D. RING & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

A. D. RING & ASSOCIATES - 10/60 - M

FCC File No.BL-9792
Accepted 3-12-63

Station WAVE
Louisville, Kentucky

970 kc

WCSH

* REVISED
DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: W C S H Main Studio: Portland, Maine

Frequency: 970 kc Power: 5 kw

Notification List No. 225* Date: May 2, 1947 Class III-A

GEOGRAPHICAL LOCATION OF ANTENNA:
North Latitude: 43° 36' 21
West Longitude: 70° 19' 25

ANTENNA CHARACTERISTICS:

Authorized for Nighttime operation (DA-N)*
Number of elements: Two (2)
Type of elements: Series-fed, self-supporting, tapered, vertical steel towers.

TOWER:	NORTHEAST		SOUTHWEST	
HEIGHT ABOVE INSULATORS:	300'		300'	(106.5°)
SPACING:	325'	or	112°	
NIGHT PHASING:	0°		+56°	
NIGHT FIELD RATIO:	1.0		1.0	

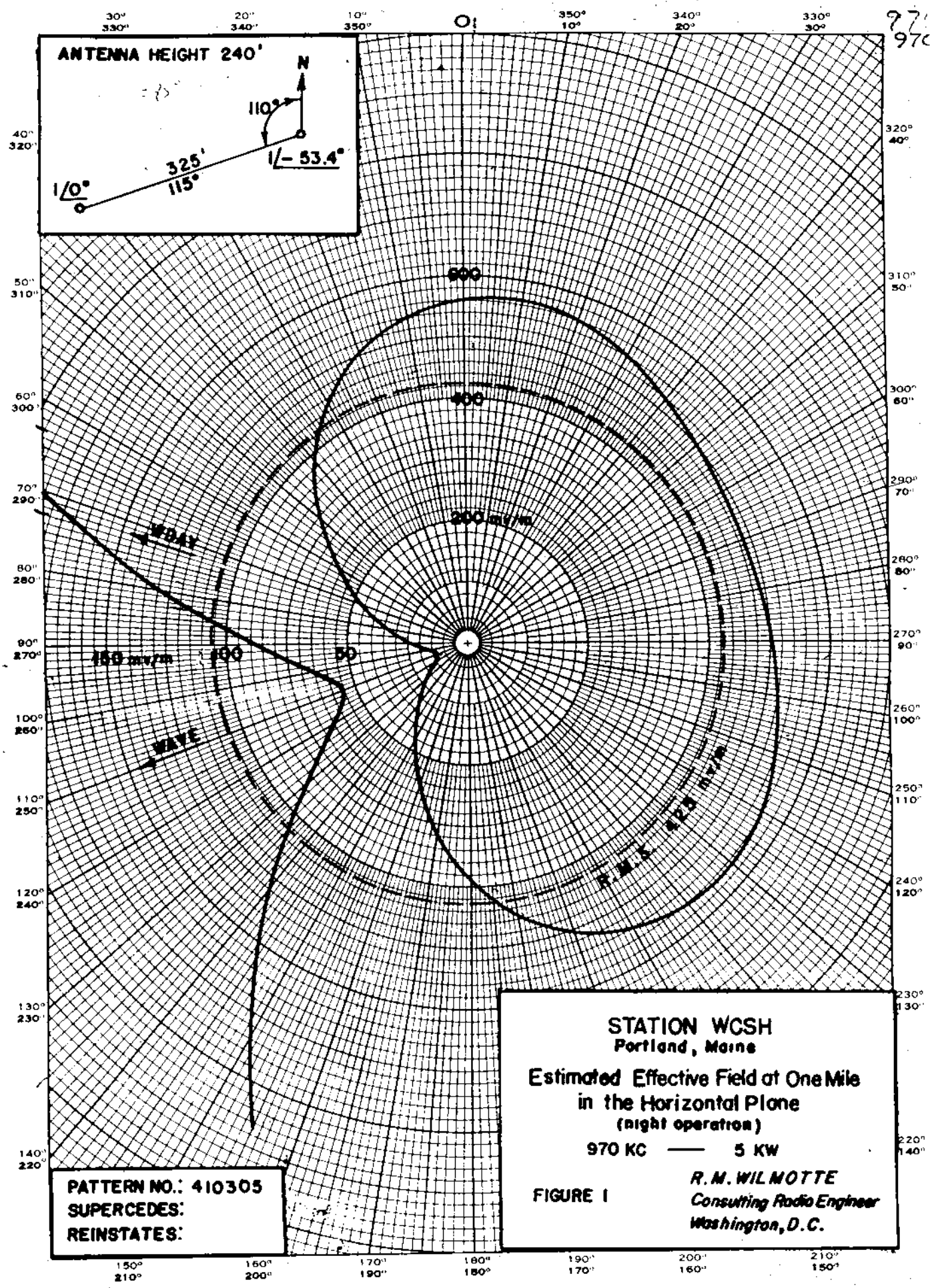
GROUND SYSTEM: 120 - 420' equally spaced radials about each tower base.

ORIENTATION: Elements on a line bearing 70° true, using the west tower as a reference.

Predicted effective Field: 425 mv/m (at rated power)

*NOTE:- The change notified (From DA to DA-N) does not involve a change in the nighttime directional pattern, and presently filed patterns should, therefore, be retained. This revised description sheet should, however, be substituted for the existing description sheet.

WCSH


ANTENNA HEIGHT 240'
N
110°
325'
115°
1/0°
1/-53.4°
600
400
200 mv/m
150 mv/m
100
50
WDAY
WAVE
R.M.S. 425 mv/m
PATTERN NO.: 410305
SUPERCEDES:
REINSTATES:
STATION WCSH
Portland, Maine
Estimated Effective Field at One Mile
in the Horizontal Plane
(night operation)
970 KC — 5 KW
FIGURE 1
R.M. WILMOTTE
Consulting Radio Engineer
Washington, D.C.
EUGENE DIETZGEN CO.
NO. 340-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE

WCSH
770

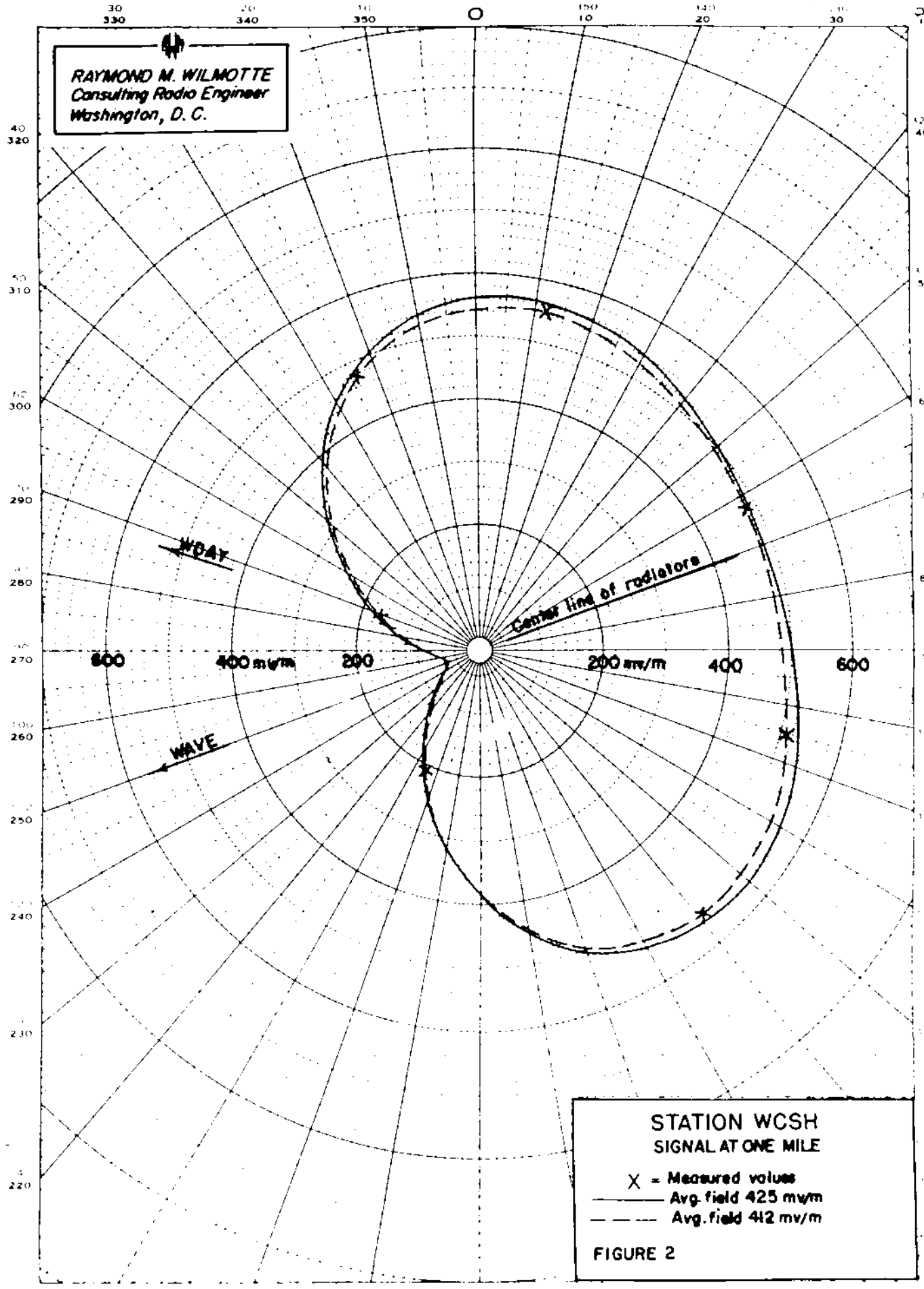
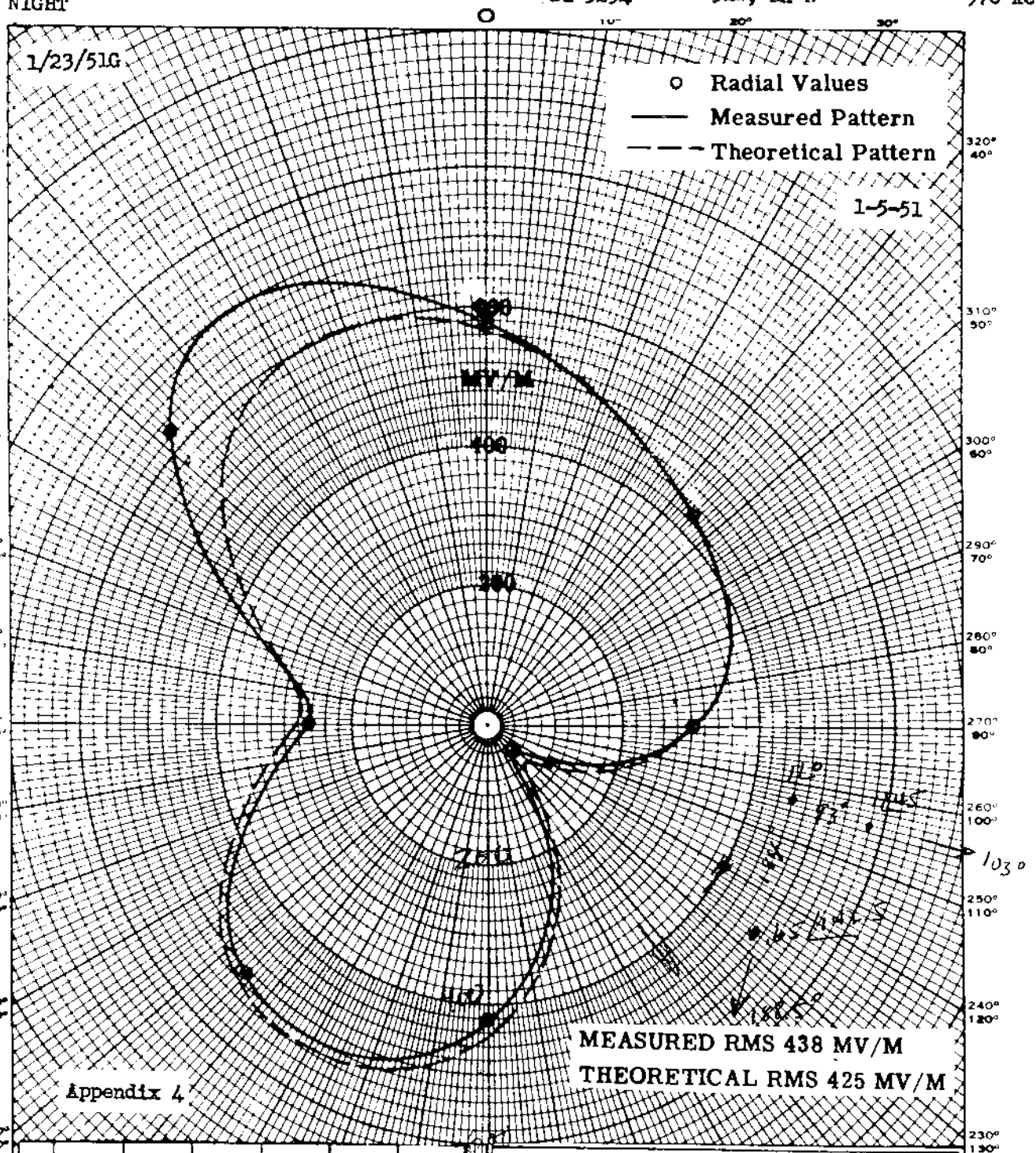


FIGURE 2

WDAY

MEASURED NIGHT | WDAY, FARGO, N. D. | BZ-3254 | 5kw, DA-N | 970 kc



Tower No.	Electrical Height C°	True Tower Orientation G°	Spacing S°	Phasing V°	Horizontal Field mv/m E	Field Ratio F
0	–	–	–	–	–	–
1	101°	Reference		0		1.0
2	101°	103°	93°	+ 45		1.0
3	101°	188.5°	184°	+142.5		0.65
4						

Latitude 46° 52′ 30″
Longitude 96° 53′ 07″

Supersedes 401219
Pattern No. 501130

WDAY
FARGO, N. D.
5 KW DA 970 KC

MEASURED NIGHTTIME RADIATION PATTERN

501130

GLENN D. GILLETT & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON 4, D.C.

WDAY, Fargo, N. D. 970 kc

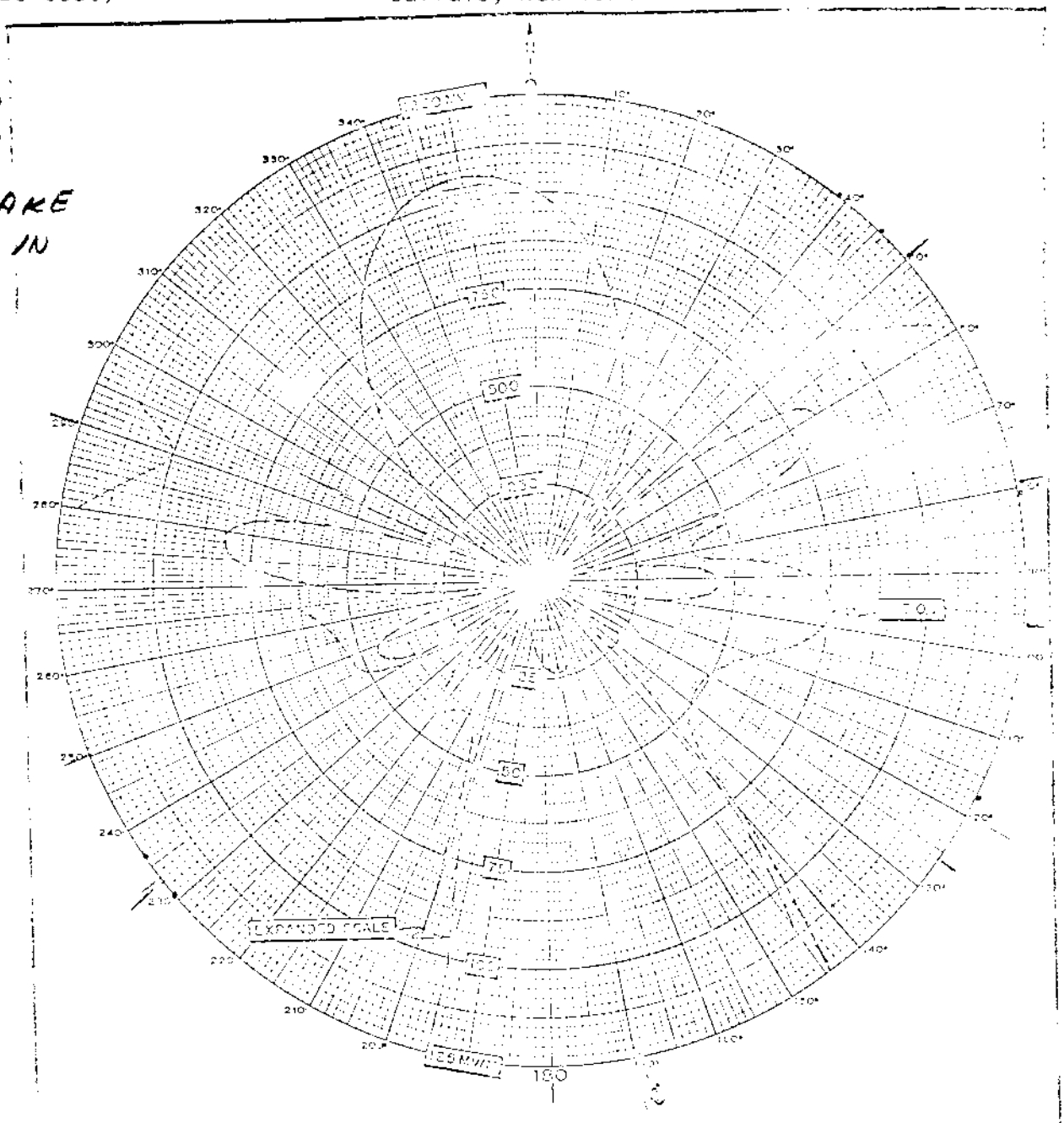
WEBR

Proposed Day & Night
(9-26-68ct)

Station WEBR
Buffalo, New York

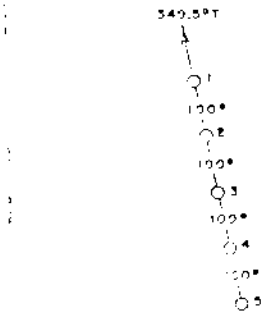
5kw, DA-1, U
970 kc

BR-18268
GRANTED
9-17-68
CP TO MAKE
CHANGES IN
MEOV



RMS = 412 MV/M

EXHIBIT 8-2



LATITUDE 42° 44' 41" North
LONGITUDE 78° 53' 13" West

1 (N)	S	S	0	1.0	-	84
2 (NE)	E	E	100.6	2.06	-	84
3 (C)	D	D	1-350	3.52	-	84
4 (SC)	A	A	100.1	2.03	-	84
5 (S)	S	S	[illegible]	1.0	-	84

THEORETICAL DIRECTIONAL
HORIZONTAL PLANE PATTERN
FOR
WEBR
BUFFALO, NEW YORK
970 KC 5 KW U-DA-1

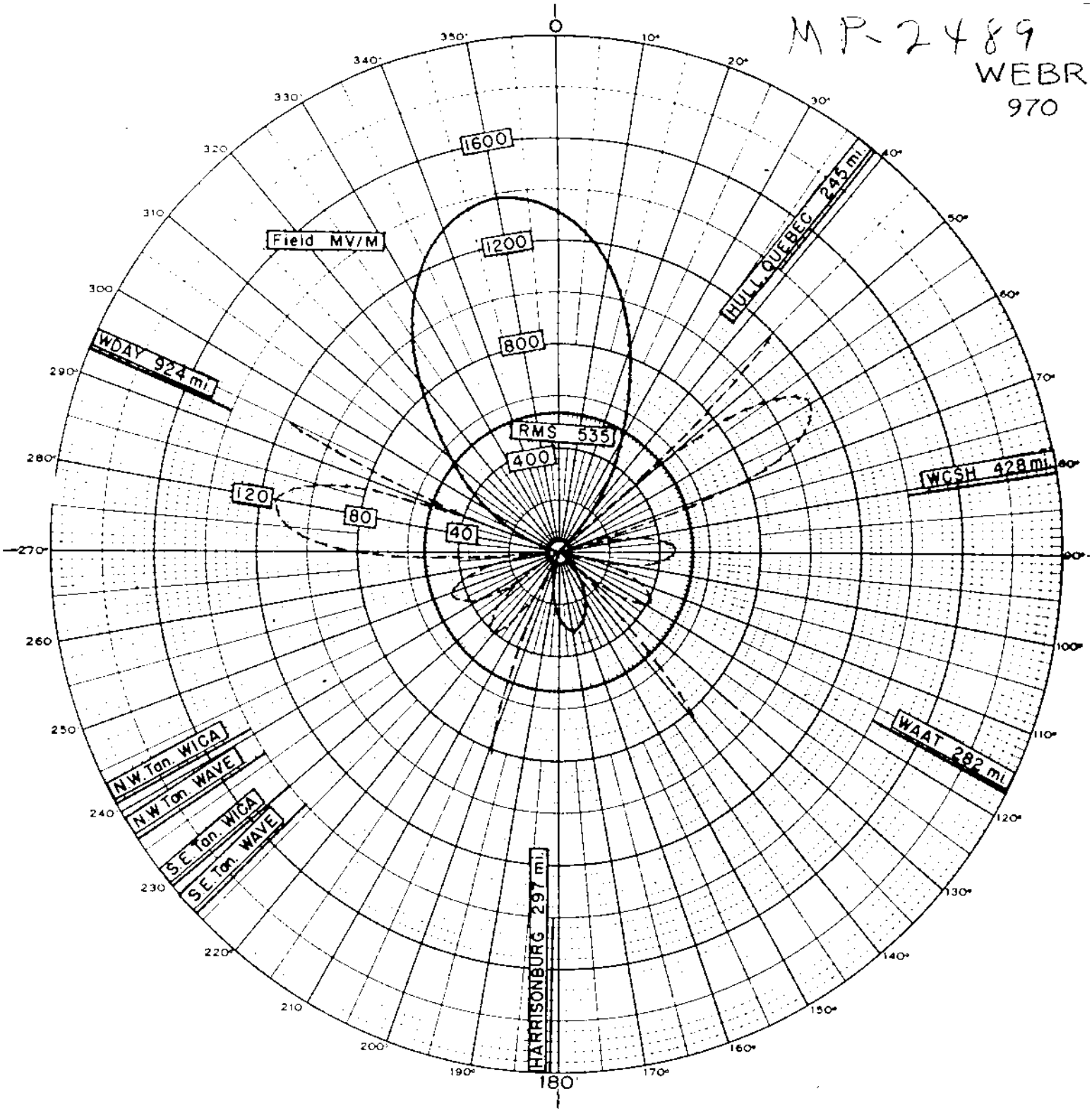
SEAR & KENNEDY

FCC File No.BP-18268
Accepted 9-10-68

Station WEBR
Buffalo, New York

970 kc

MP-2489
WEBR
970



WEBR INCORPORATED
BUFFALO, N. Y.

Figure 1
Series 461219C

970 KC
5000 WATTS
DAY & NIGHT

N
349.5° 1∠0°
2.66∠160.6°
SPACING 100° 3.52∠-35°
2.66∠129.1°
H = 84° 1∠-70°

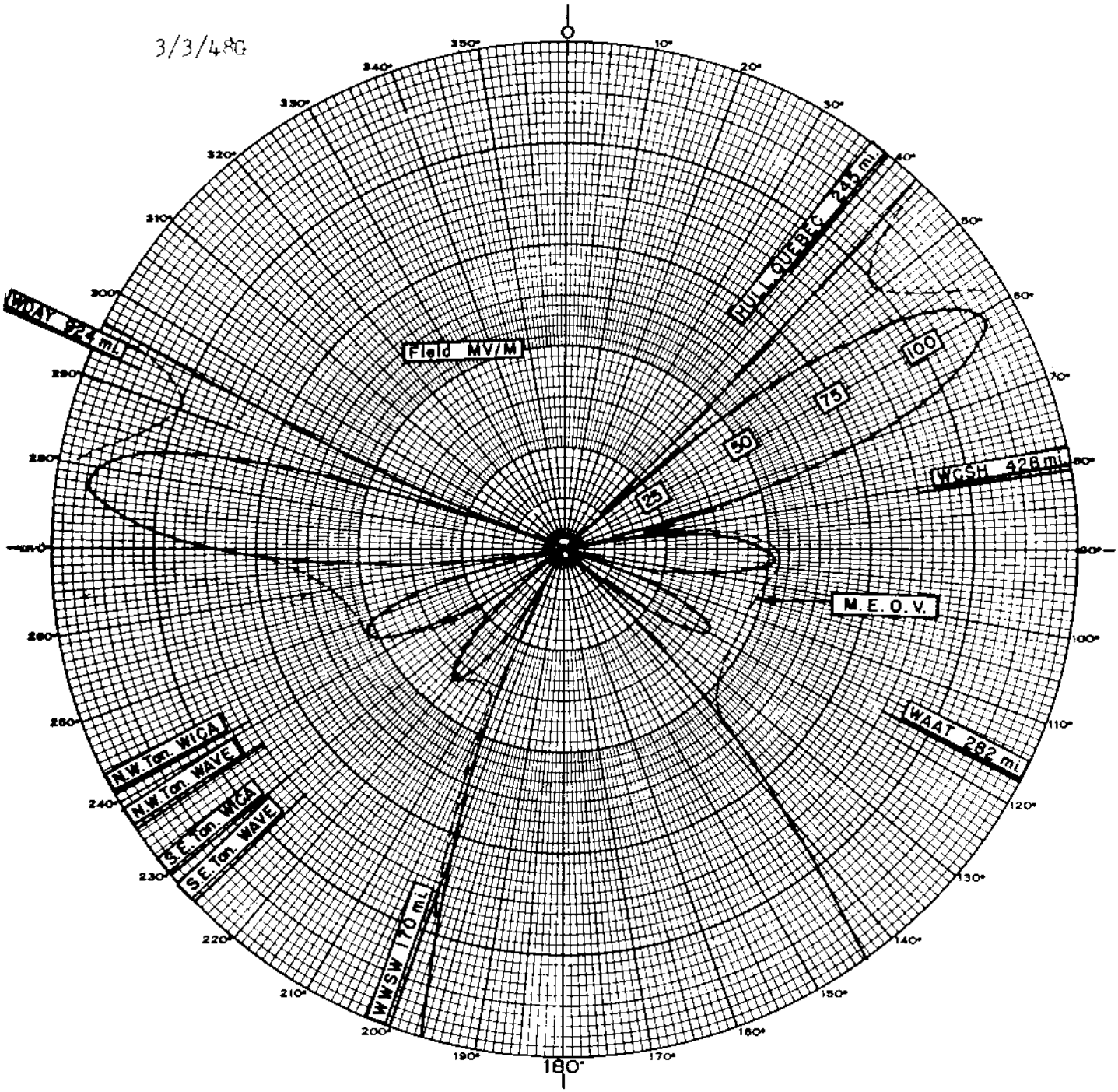
PROPOSED

DIRECTIONAL ANTENNA PATTERN

FRANK H. McINTOSH
Consulting Radio Engineer
Washington, D.C.

WEBR
970

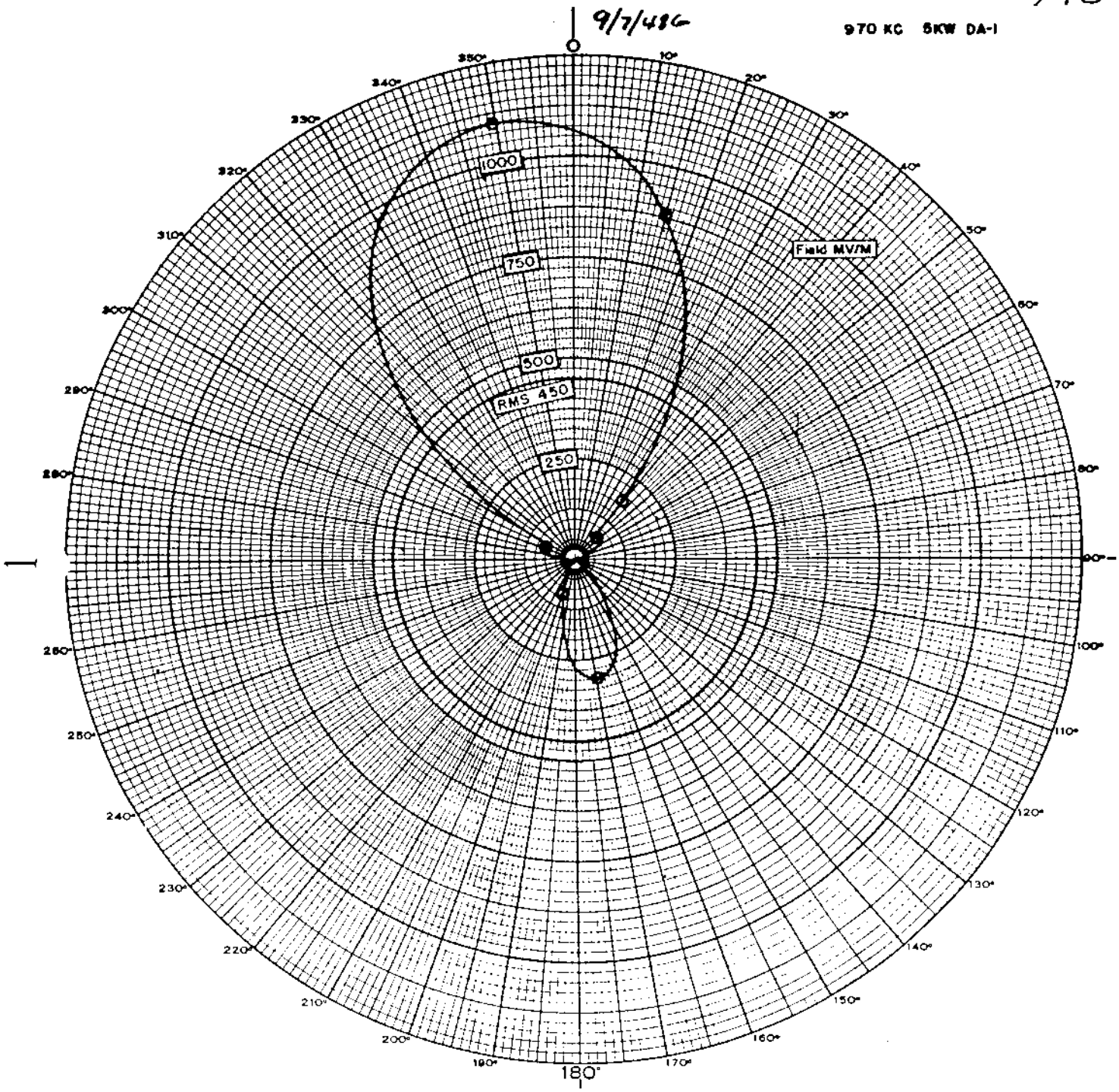
3/3/48G



WEBR INCORPORATED BUFFALO, N. Y.		Figure 1 Series 471229C
		970 KC 5000 WATTS DAY & NIGHT
N 1.0° 190.5° 2.66∠160.6° SPACING 100° 3.52∠-35° 2.66∠129.1° H=84° 1.∠-70°	PROPOSED DIRECTIONAL ANTENNA PATTERN	FRANK H. McINTOSH *Consulting Radio Engineer* Washington, D.C.

Rec'd 3-1-48 WEBR

WEBR
970



WEBR INCORPORATED BUFFALO, N. Y.	Figure 6 A Series 480312C 970 KC 5000 WATTS DAY-NIGHT
MEASURED DIRECTIONAL ANTENNA PATTERN	FRANK H. McINTOSH *Consulting Radio Engineer* Washington, D.C.

WEBR

Measured Day & Night
(3-28-69ct)

Station WEBR
Buffalo, New York

5kw, DA-1, U
970 kc

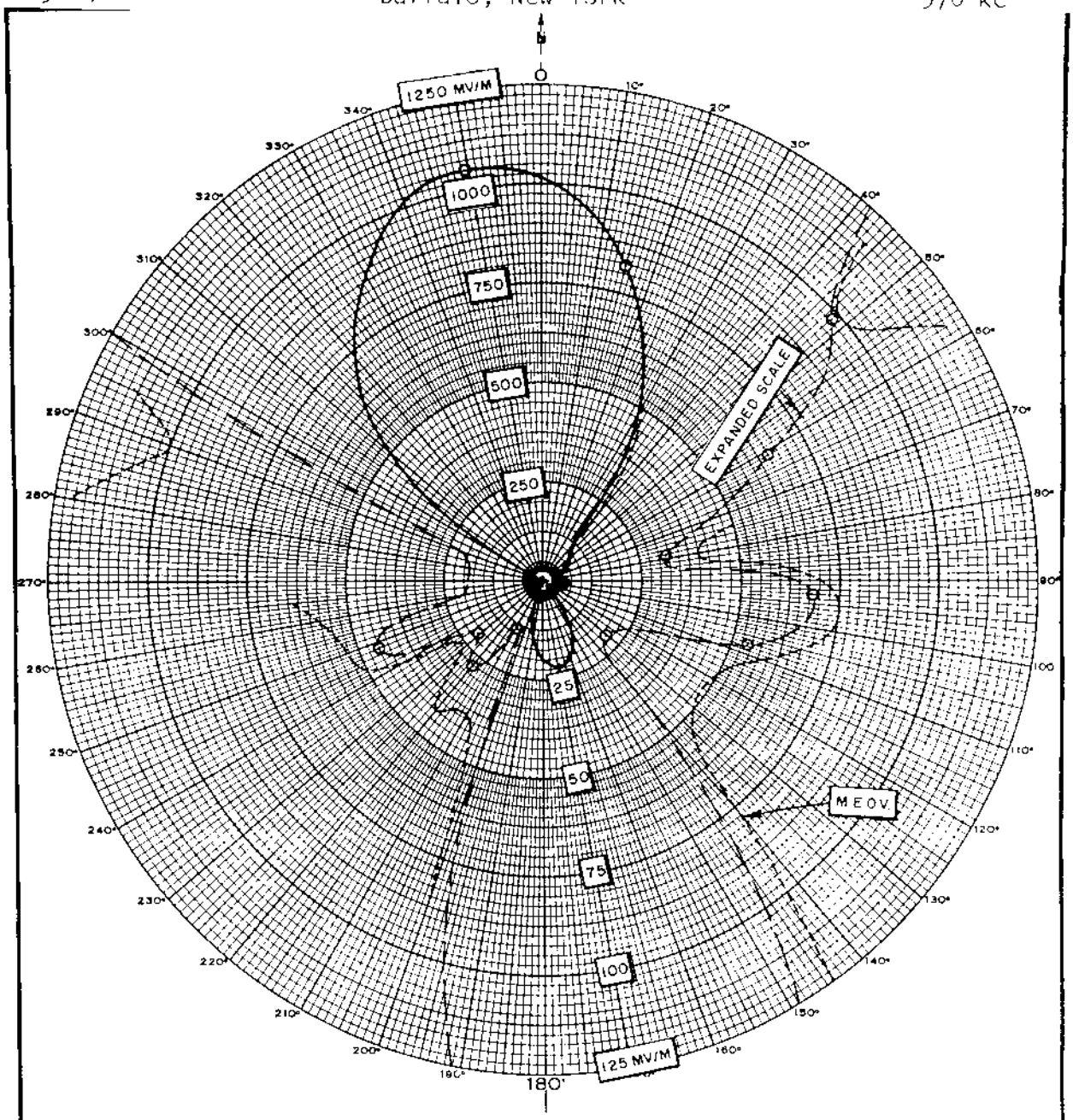
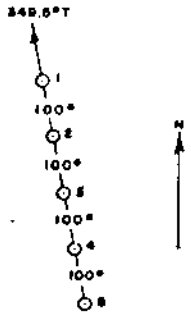


EXHIBIT G



LATITUDE 42° 44' 41" North
LONGITUDE 78° 53' 13" West

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
		THEORETICAL				
1 (N)	SEE DIAGRAM	SEE DIAGRAM	0	1.0	-	84
2 (NC)			160.6	2.66	-	84
3 (C)			-35.0	3.52	-	84
4 (SC)			129.1	2.66	-	84
5 (S)			-70	1.0	-	84

MEASURED DIRECTIONAL
HORIZONTAL PLANE PATTERN
WEBR
BUFFALO, NEW YORK
970 KC 5 KW DA-1, U
690212

KEAR & KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D. C.

FCC File No. BL-12290
Accepted 3-11-69

Station WEBR
Buffalo, New York

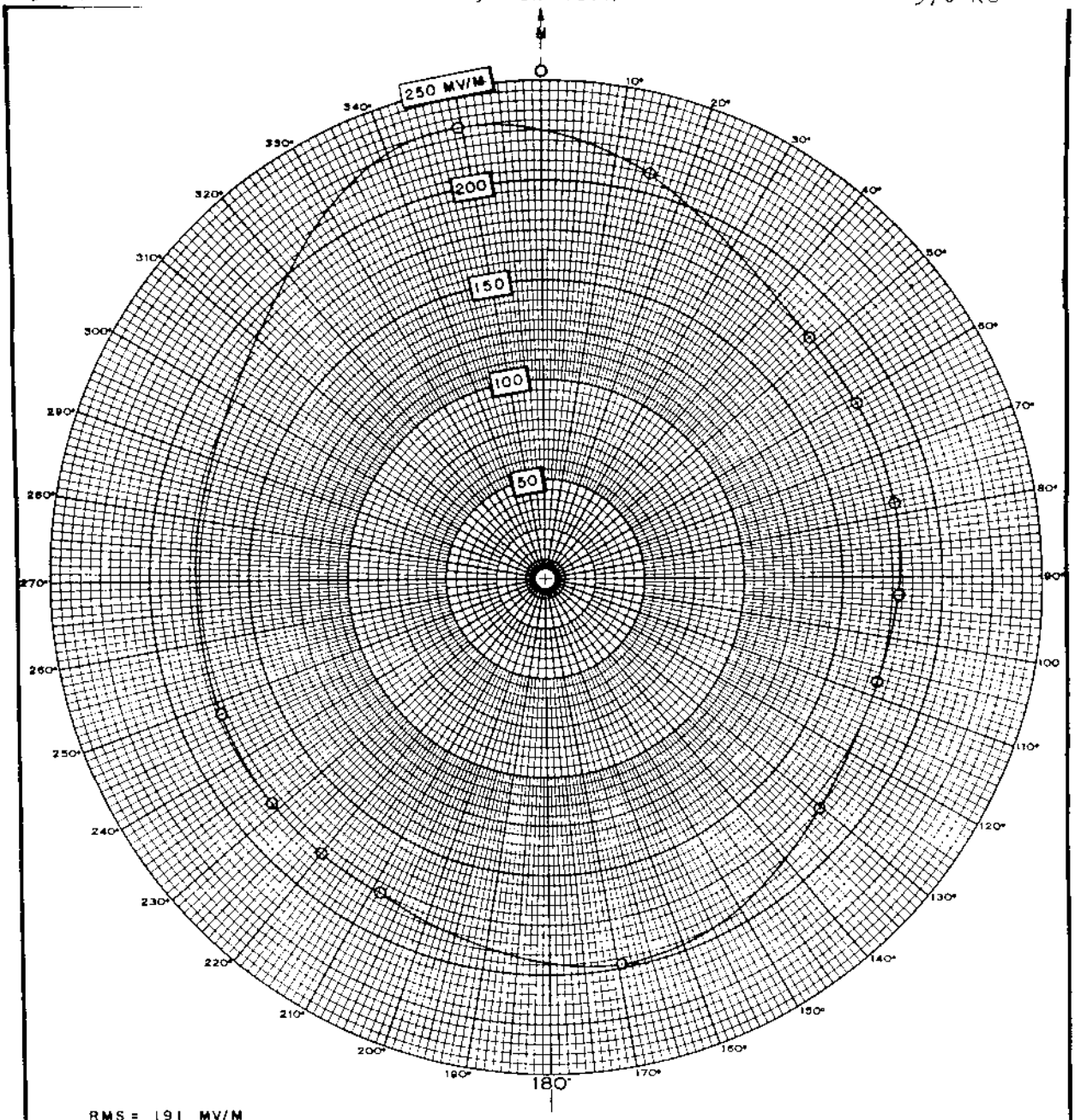
970 kc

WEBR

Measured Non-DA
(3-28-69ct)

Station WEBR
Buffalo, New York

5kw,DA-1,U
970 kc



RMS = 191 MV/M

NON-DIRECTIONAL MEASURED AT 1.0 KW INPUT

EXHIBIT E

LATITUDE 42° 44' 41" North
LONGITUDE 78° 53' 13" West

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
3	—	—	—	—	—	84

MEASURED NON-DIRECTIONAL
HORIZONTAL PLANE PATTERN
WEBR
BUFFALO, NEW YORK
970 KC 5 KW DA-1, U
690212

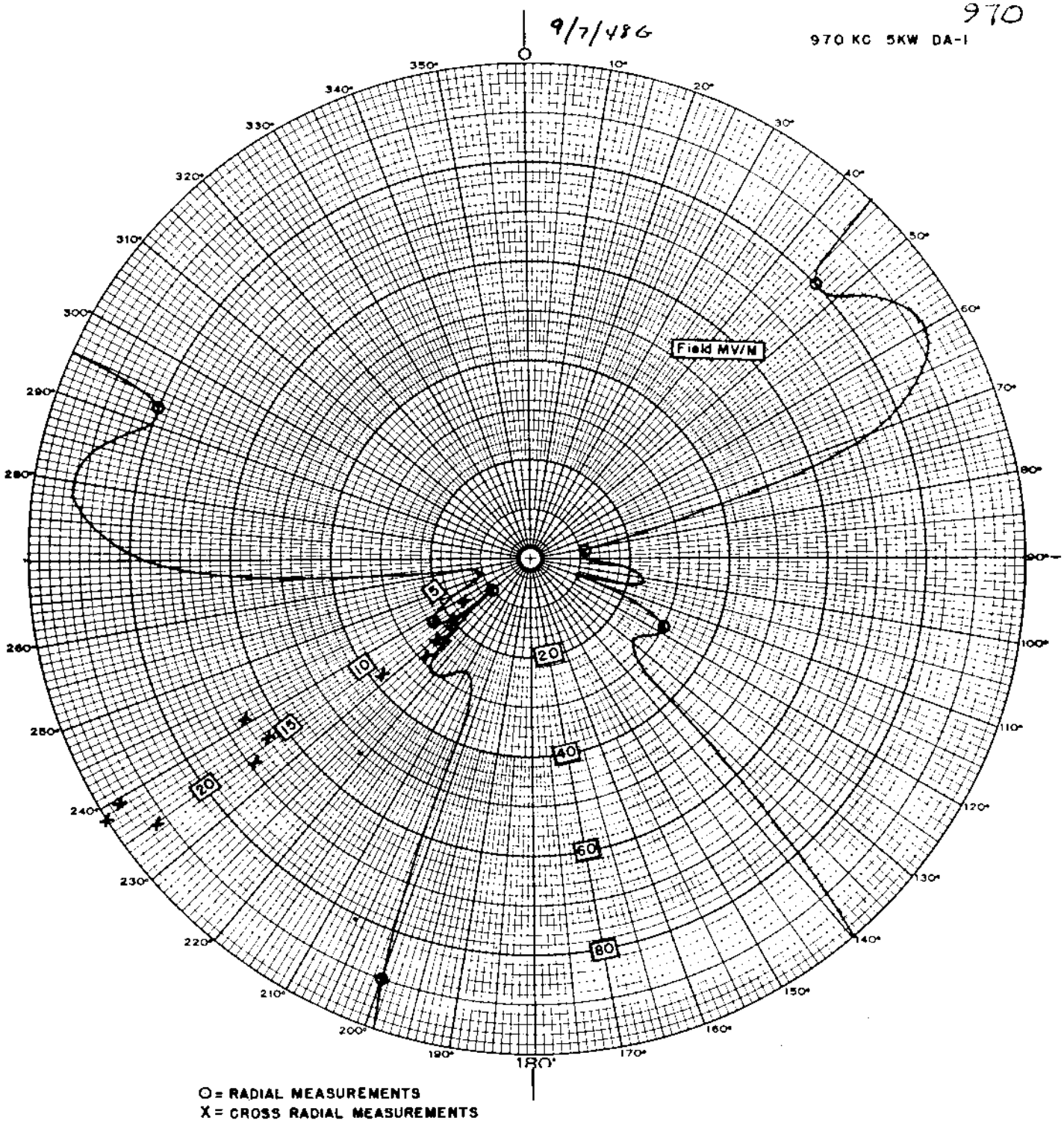
KEAR & KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D. C.

FCC File No.BL-12290
Accepted 3-11-69

Station WEBR
Buffalo, New York

970 kc

WEBR
970



O = RADIAL MEASUREMENTS
X = CROSS RADIAL MEASUREMENTS

WEBR INCORPORATED BUFFALO, N. Y.	Figure 6B Series 480313 C 970 KC 5000 WATTS DAY-NIGHT
MEASURED DIRECTIONAL ANTENNA PATTERN	FRANK H. McINTOSH *Consulting Radio Engineer* Washington, D.C.

WFLA

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WFLA Main Studio: Tampa, Florida

Frequency: 970 kHz Power: 5 kW

Notification List No. 1658 Date: November 12, 1975 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 28° 01' 14"
West Longitude: 82° 36' 34"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 5
Type of elements: Series-excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	N(#1)	NE(#2)	W(#3)	S(#4)	C(#5)
HEIGHT ABOVE INSULATORS:	567'	203'	203'	203' (72°)	567' (201°)
NIGHT PHASING:	0°	-45°	+45°	0°	-
NIGHT FIELD RATIO:	1.0	1.0	0.6	0.6	-
DAY PHASING:	0°	-	-	-	+16°
DAY FIELD RATIO:	1.0	-	-	-	0.42

SPACING AND ORIENTATION: Daytime elements #1 and #5 are spaced 614.67' (218°) on a line bearing 176° true.

Nighttime, towers #1, #2, #3 and #4 are located at the vertices of a parallelogram the long sides of which are 619.9' (220°) in length on a line bearing 186° true. The short sides are 338.1' (120°) in length on a line bearing 150° true.

GROUND SYSTEM: 120-250' equally spaced copper radials plus a 48' square grouns screen about each tower. Radials are shortened along intersections between towers.

Predicted effective Night Field: 430 mv/m at rated power.

Predicted effective Day Field: 560 mv/m at rated power.

(Cont'd)

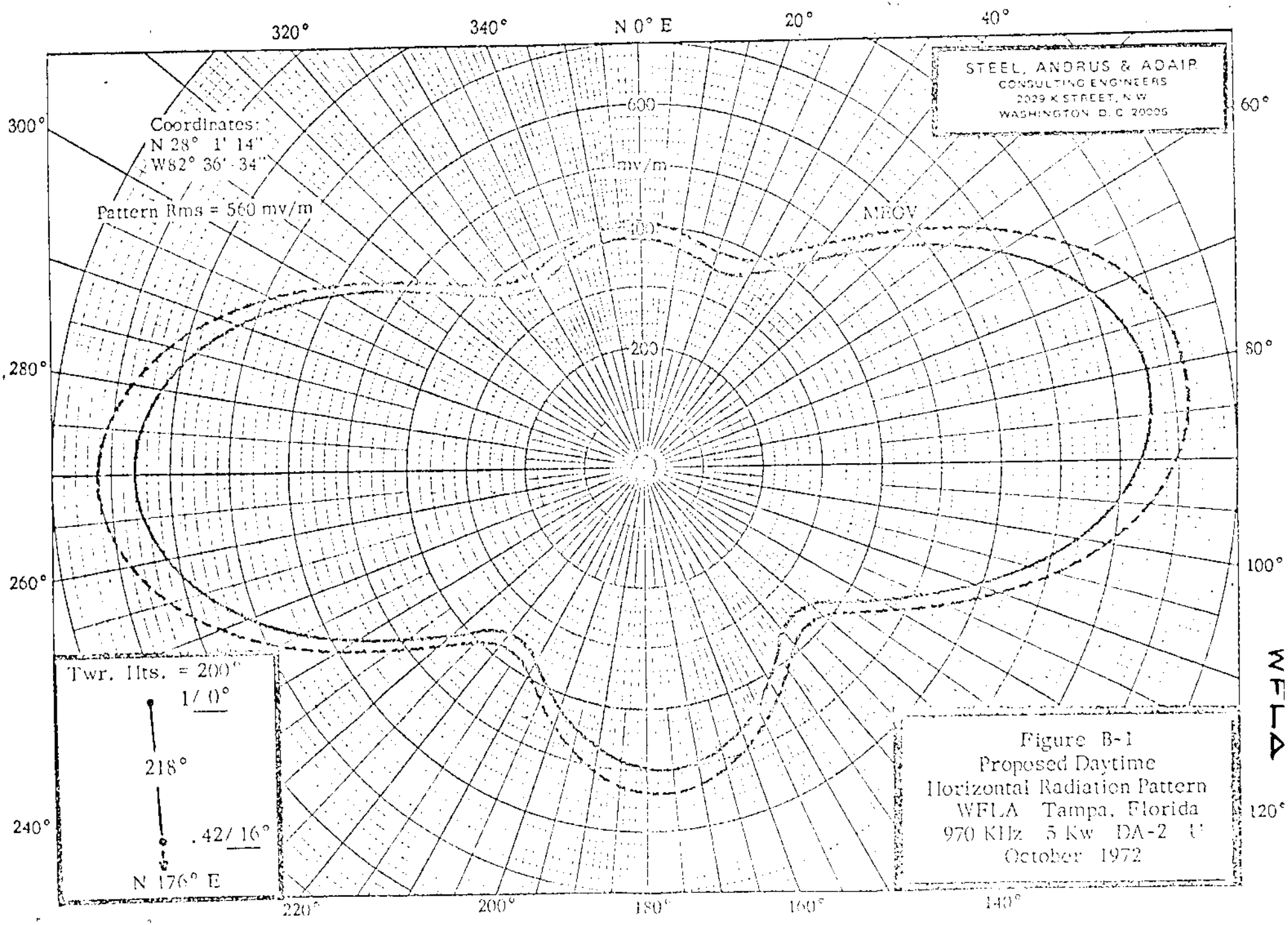
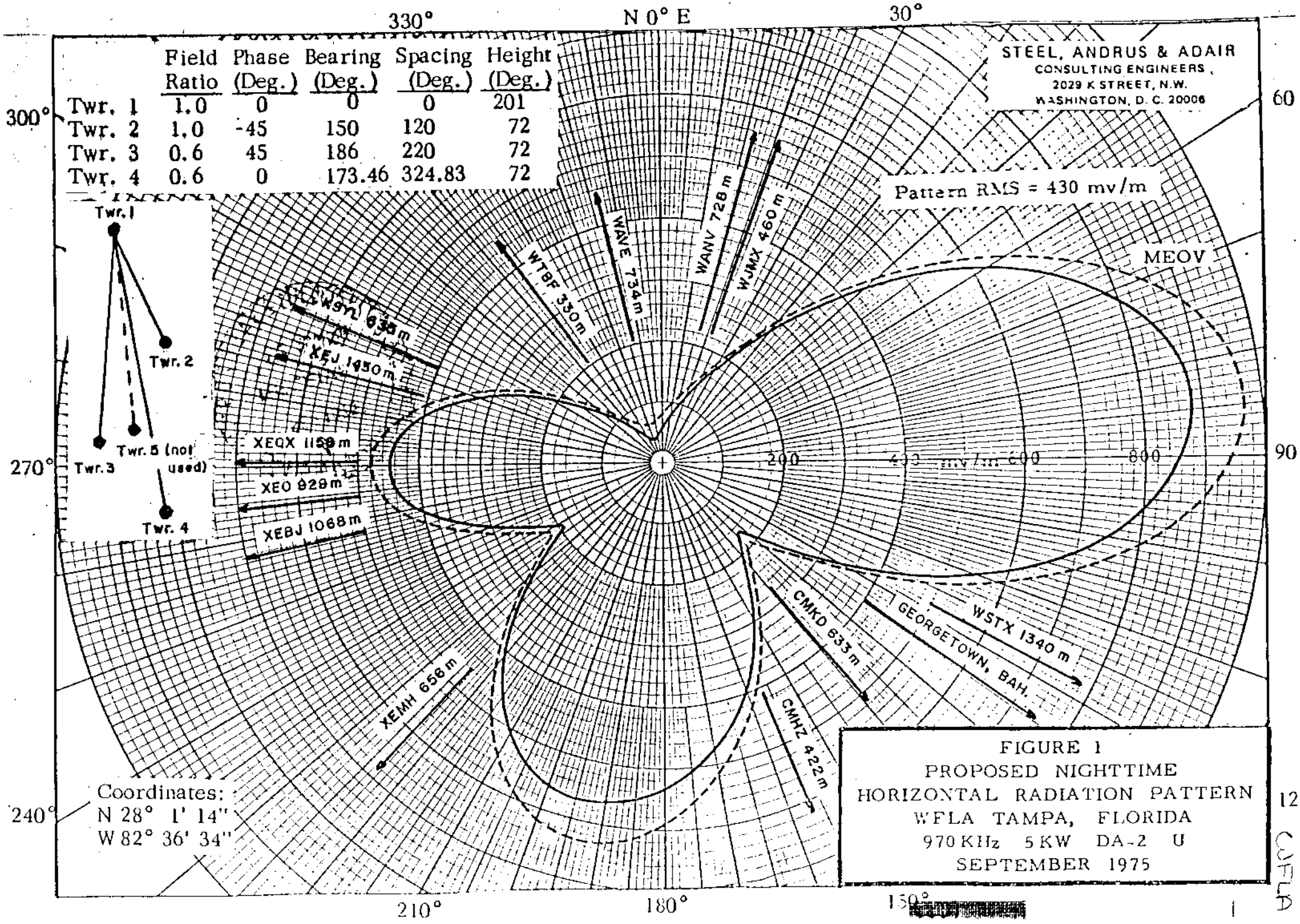


Figure B-1
Proposed Daytime
Horizontal Radiation Pattern
WFLA Tampa, Florida
970 KHz 5 Kw DA-2 U
October 1972

Note: Please retain the Daytime directional antenna radiation pattern notified for station WFLA in United States Change List Number 1572 dated March 21, 1974 and attach to this Revised Description Sheet and Nighttime patterns. This notification concerns only minor changes in meovs of radiation in the nighttime pattern with Daytime operation continued as previously notified.

CTR NO 30816A5



	Field Ratio	Phase (Deg.)	Bearing (Deg.)	Spacing (Deg.)	Height (Deg.)
Twr. 1	1.0	0	0	0	201
Twr. 2	1.0	-45	150	120	72
Twr. 3	0.6	45	186	220	72
Twr. 4	0.6	0	173.46	324.83	72

FIGURE 1
PROPOSED NIGHTTIME
HORIZONTAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
970 KHz 5 KW DA-2 U
SEPTEMBER 1975

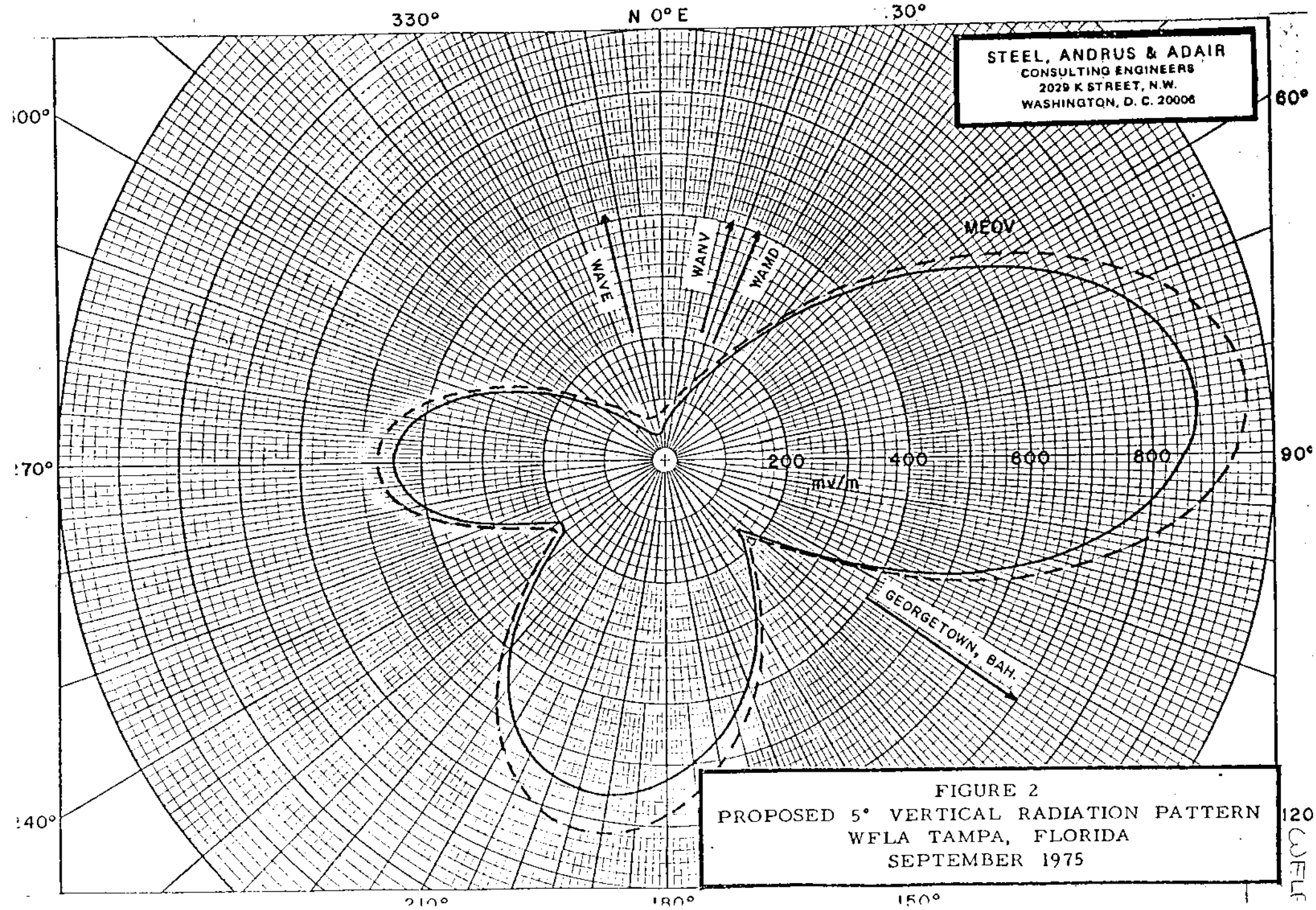


FIGURE 2
PROPOSED 5° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

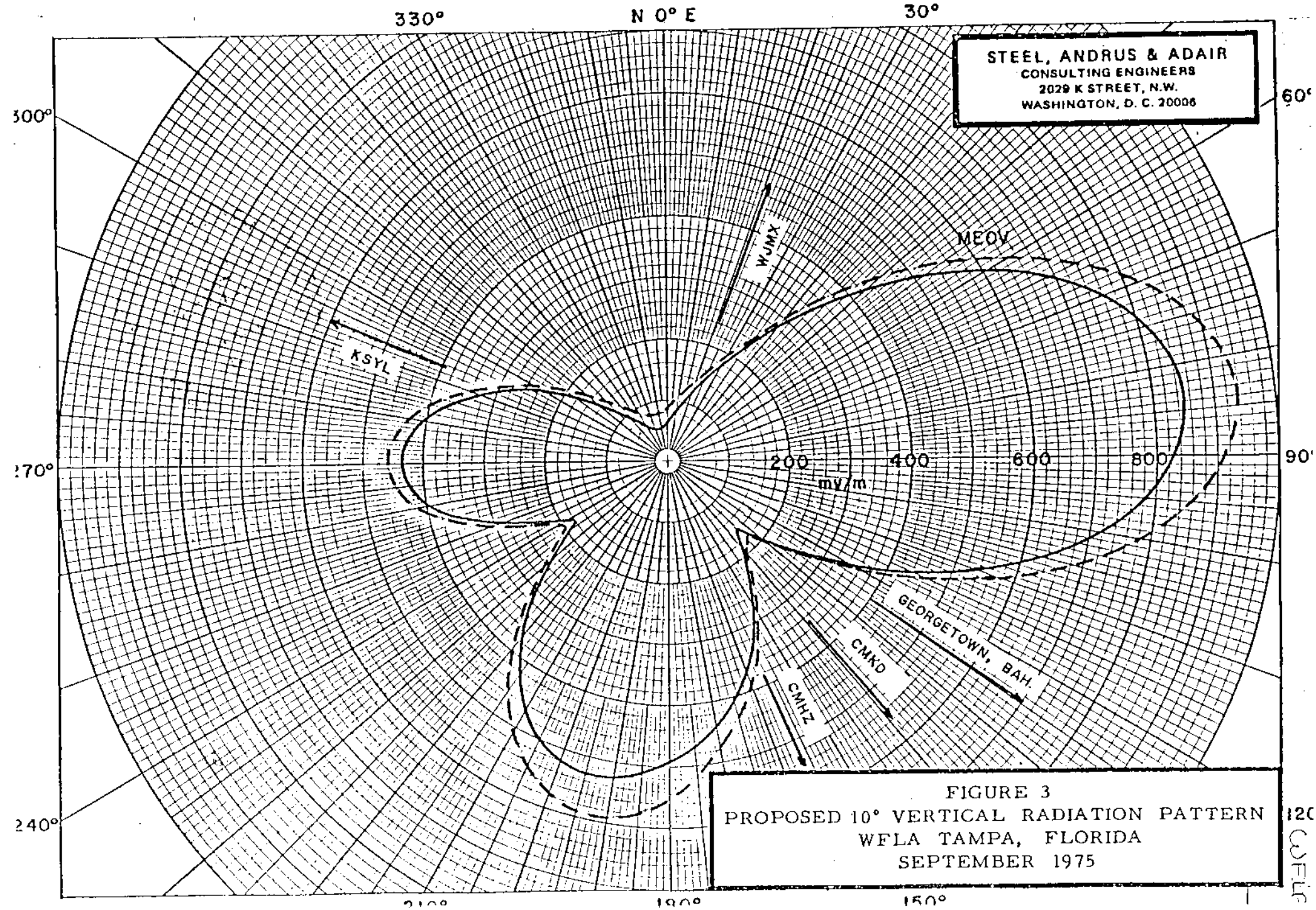


FIGURE 3
PROPOSED 10° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

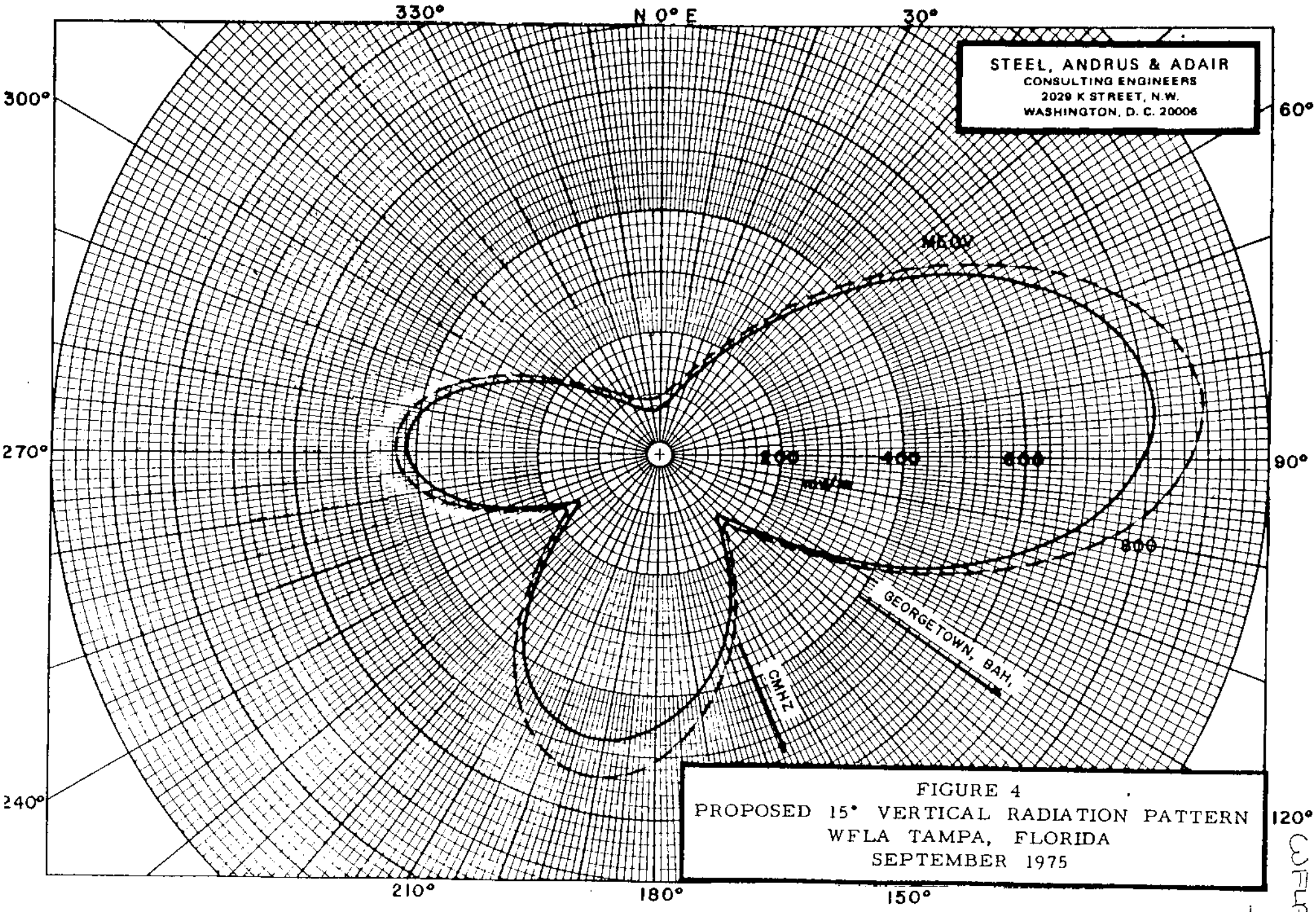


FIGURE 4
PROPOSED 15° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

WFLA

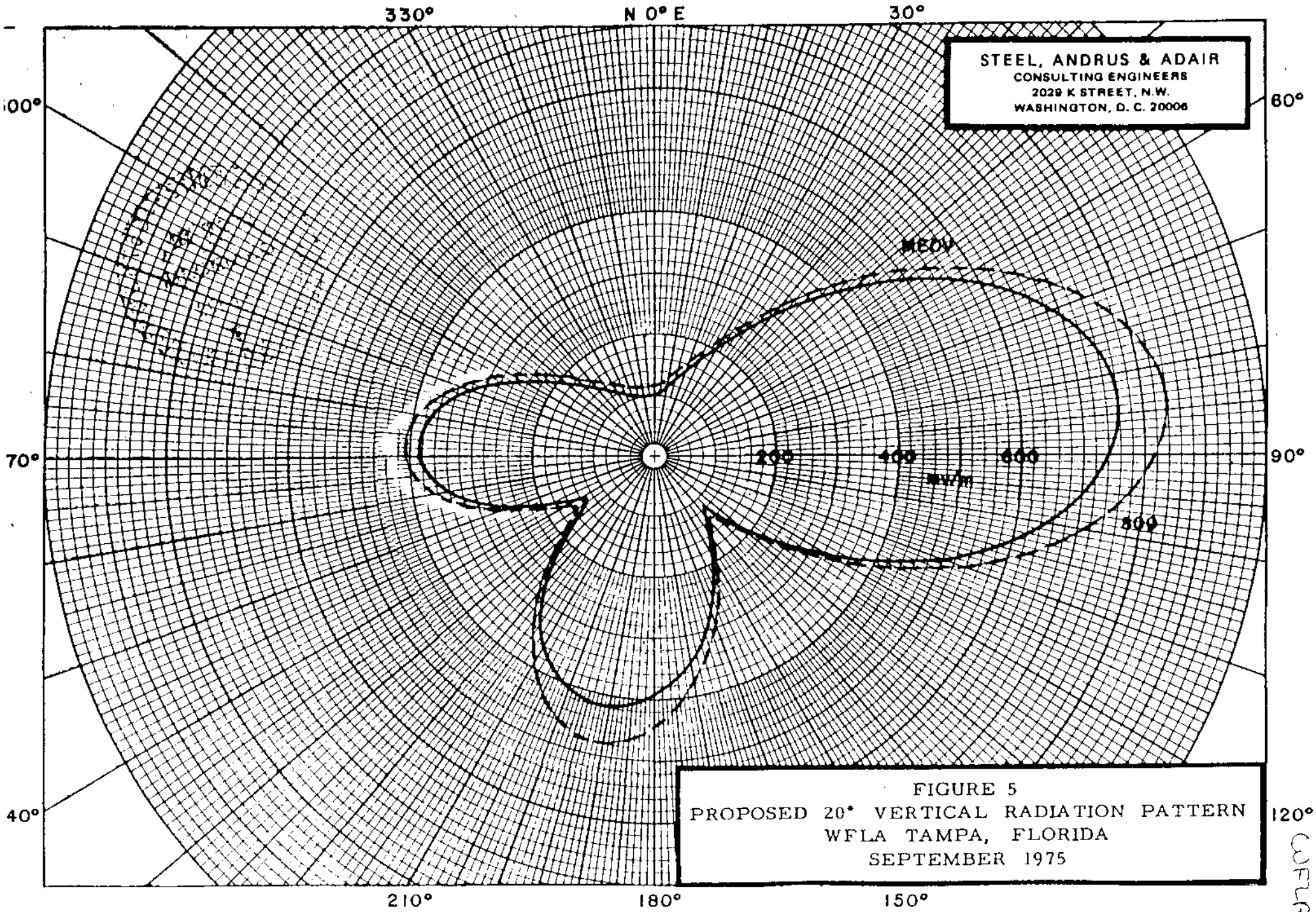


FIGURE 5
PROPOSED 20° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

WFLA

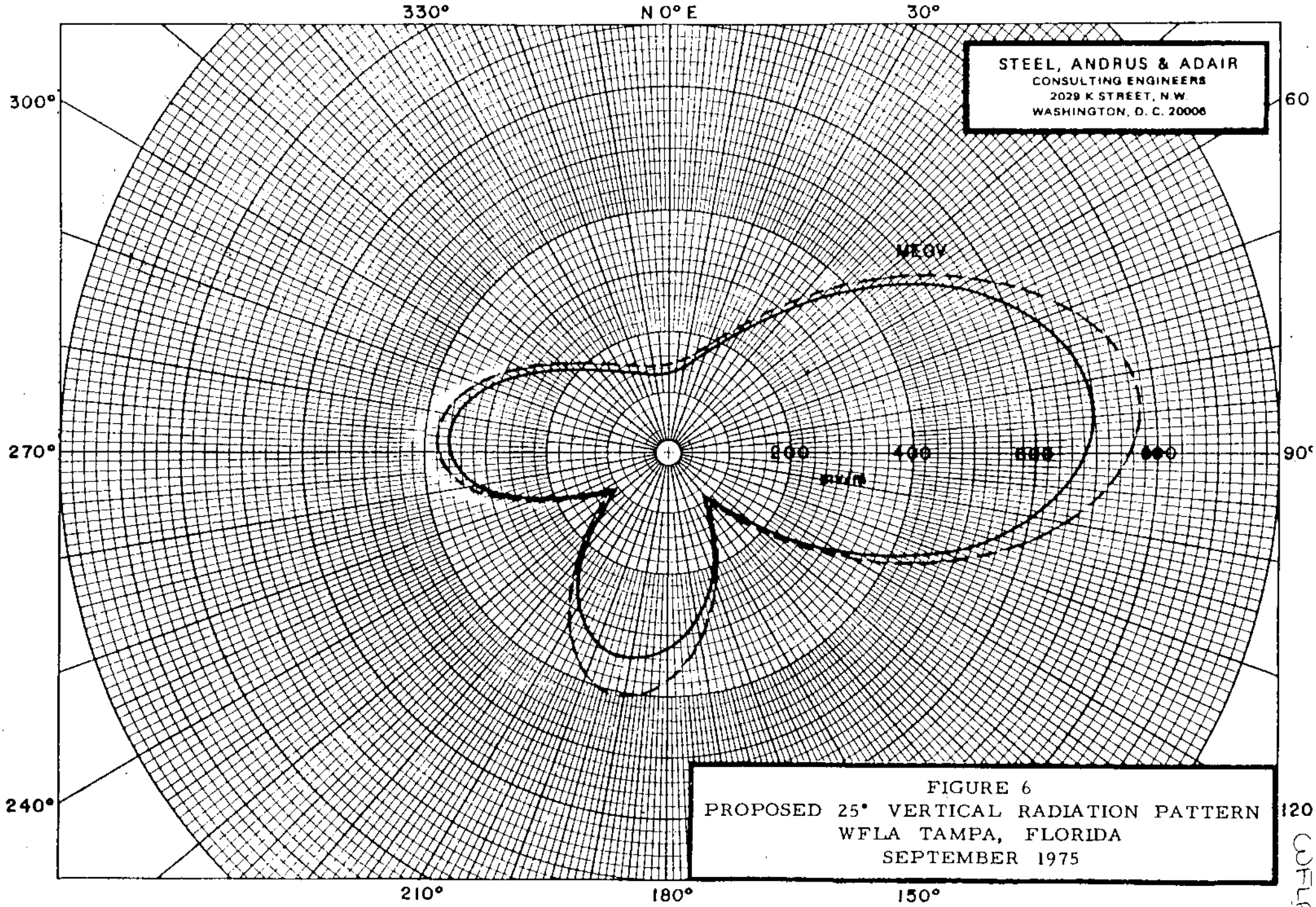


FIGURE 6
PROPOSED 25° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

WFLA

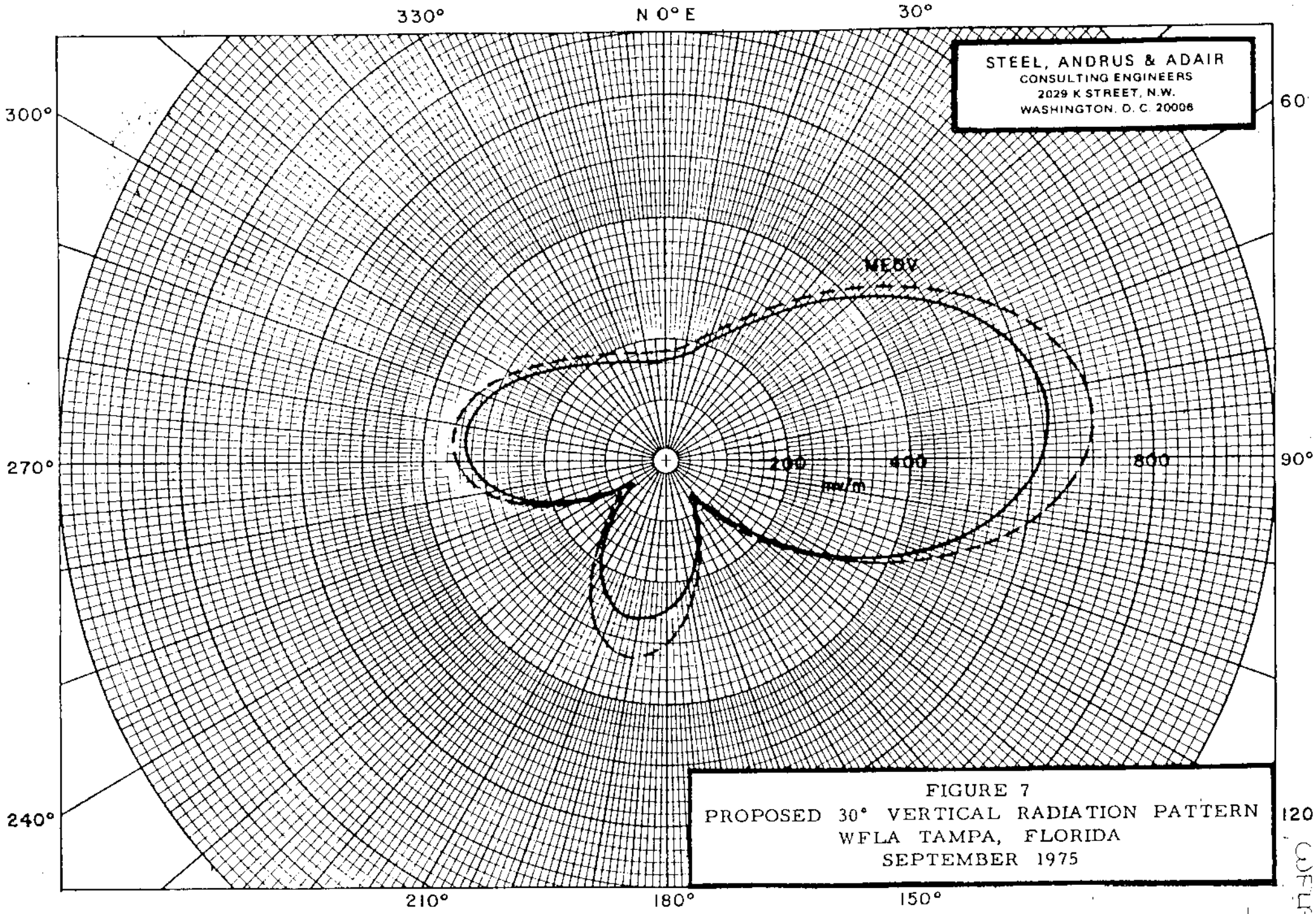


FIGURE 7
PROPOSED 30° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

WFLA

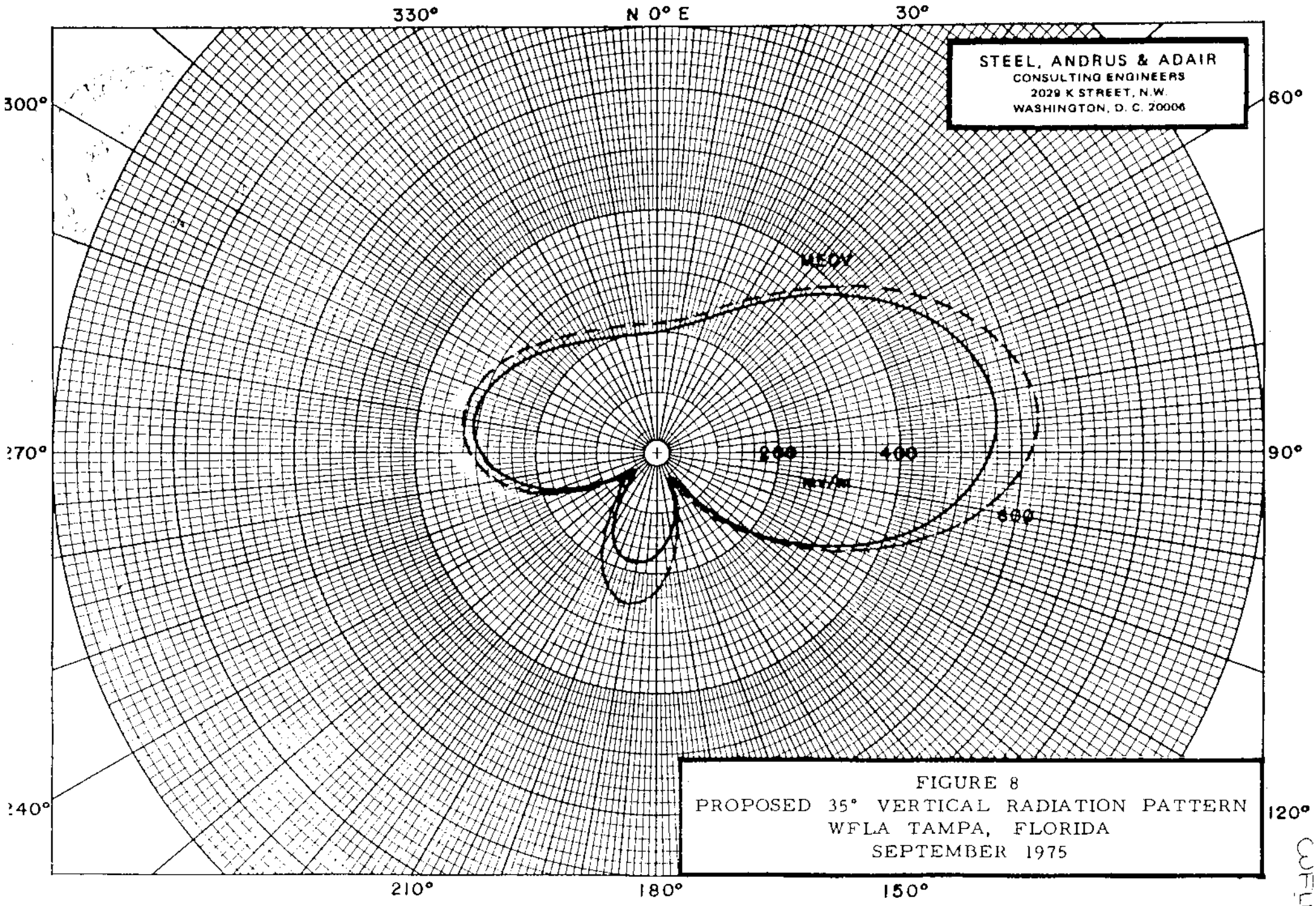


FIGURE 8
PROPOSED 35° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

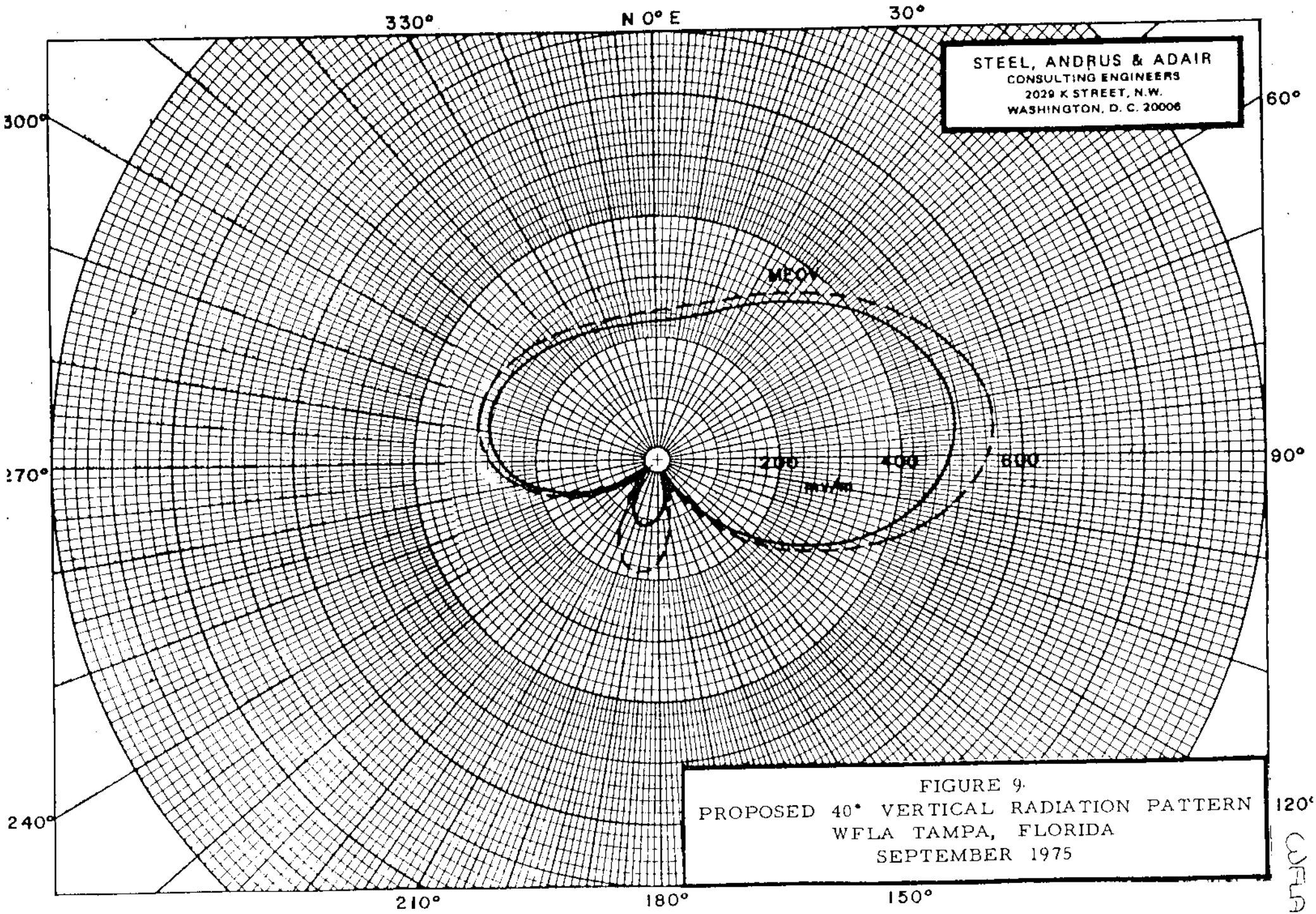


FIGURE 9
PROPOSED 40° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

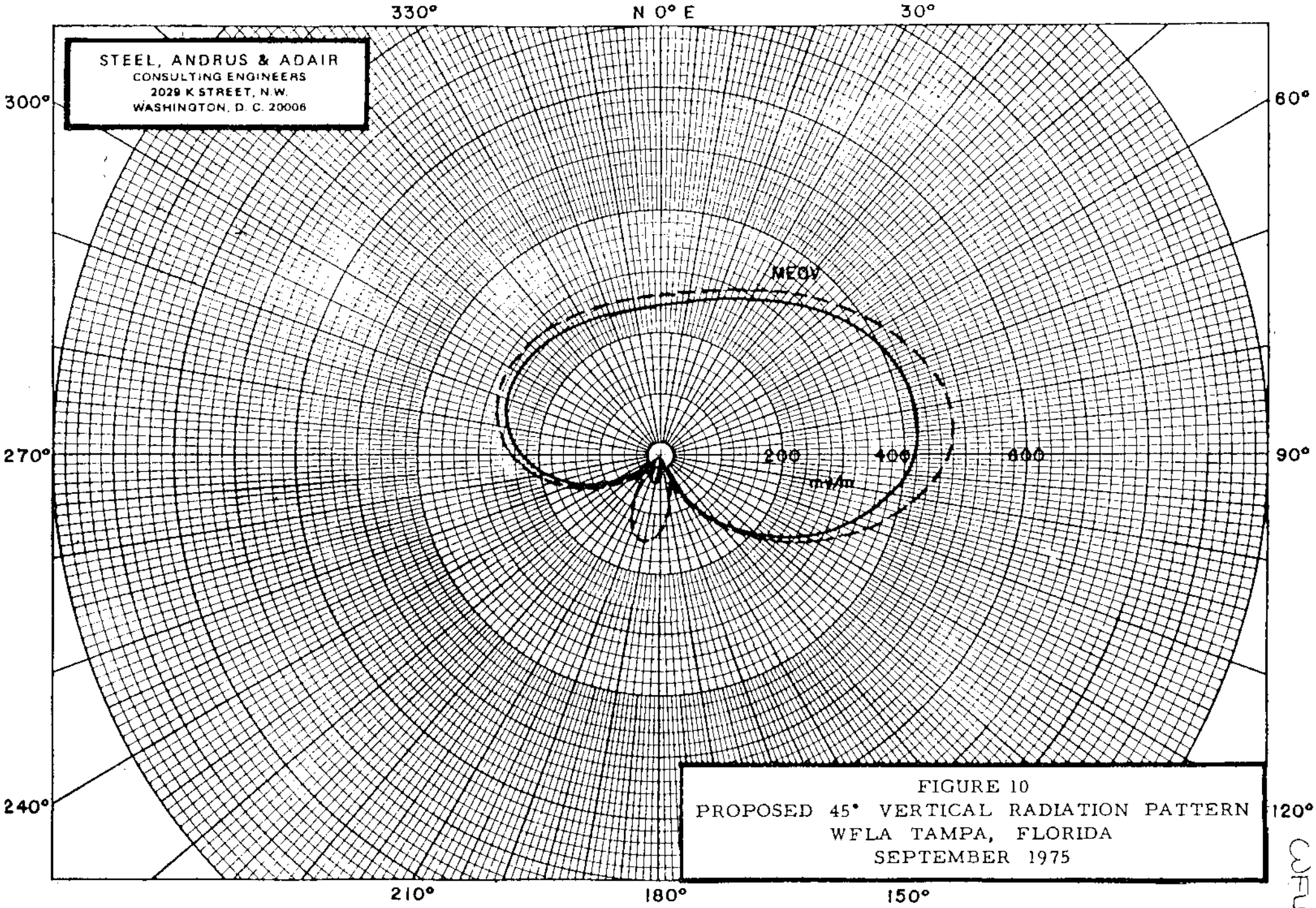


FIGURE 10
PROPOSED 45° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

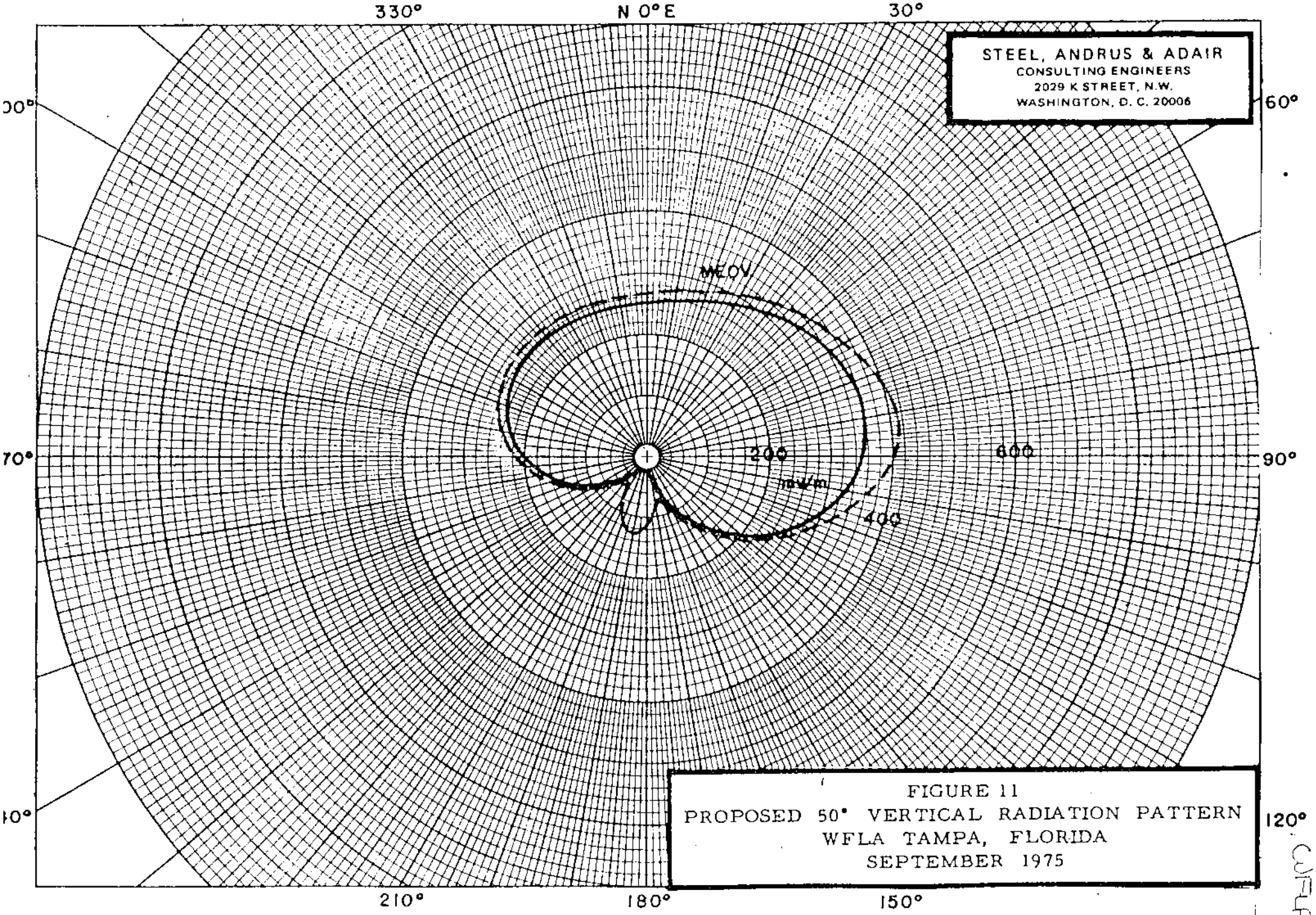


FIGURE 11
PROPOSED 50° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

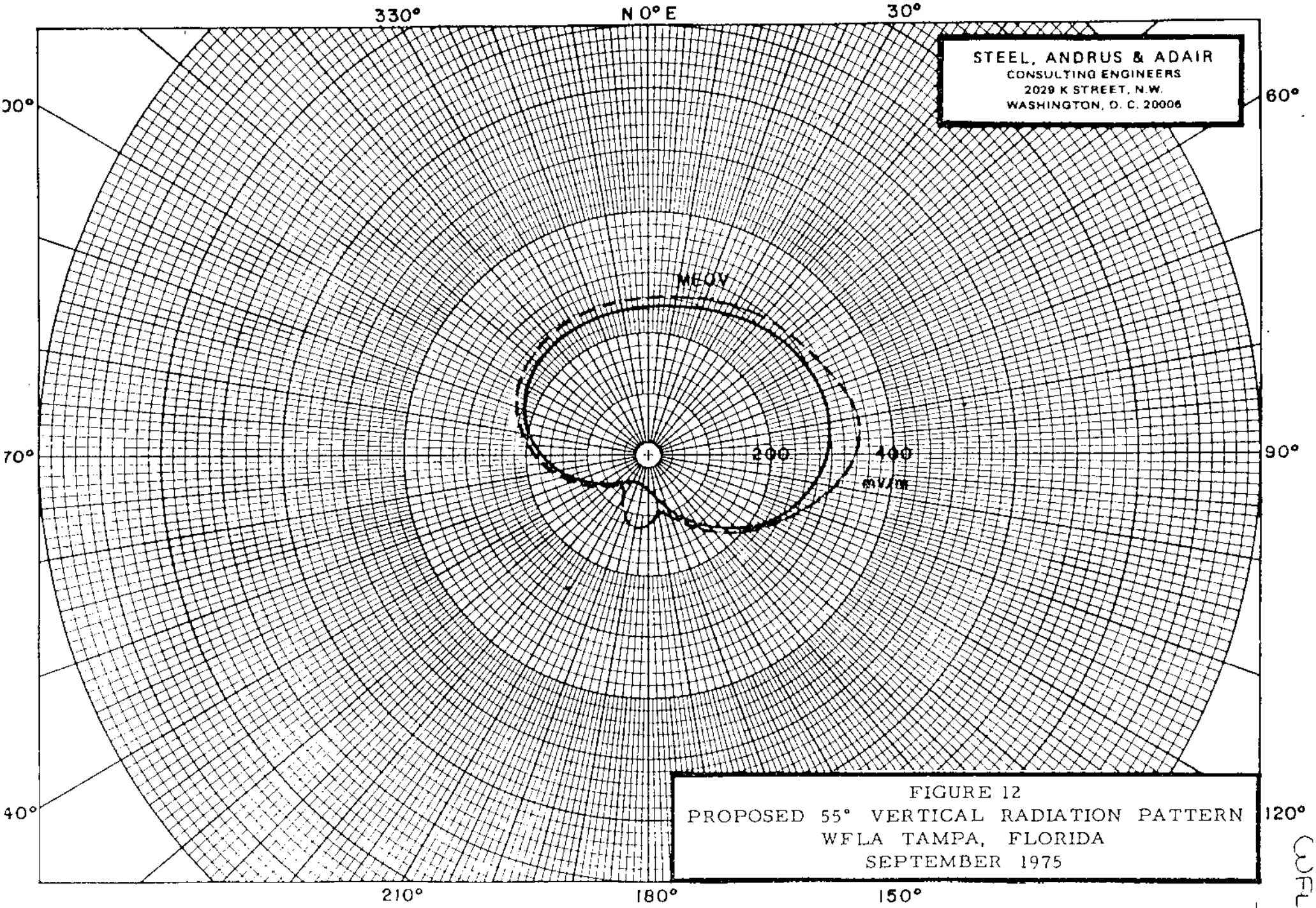


FIGURE 12
PROPOSED 55° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

WFLA

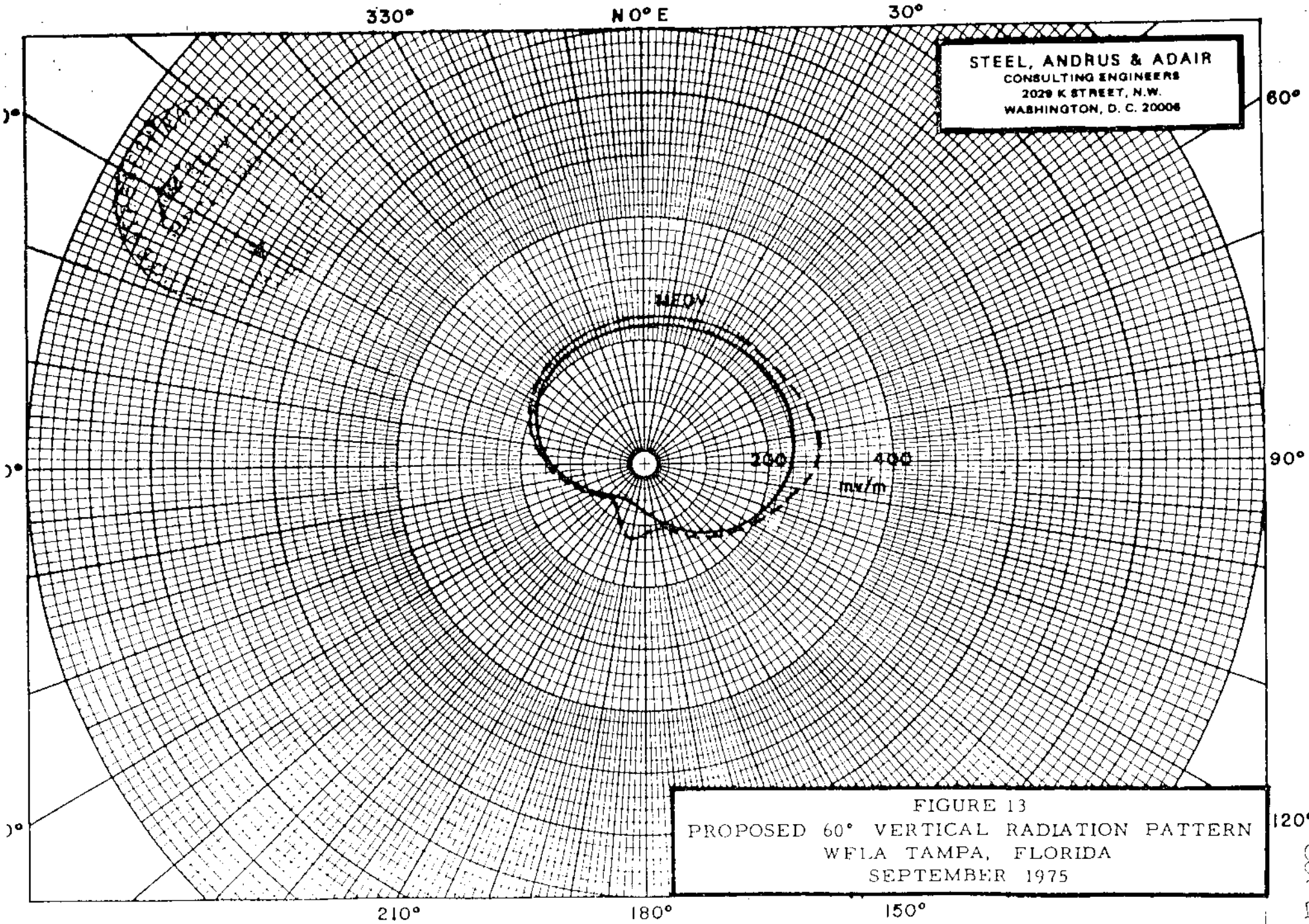
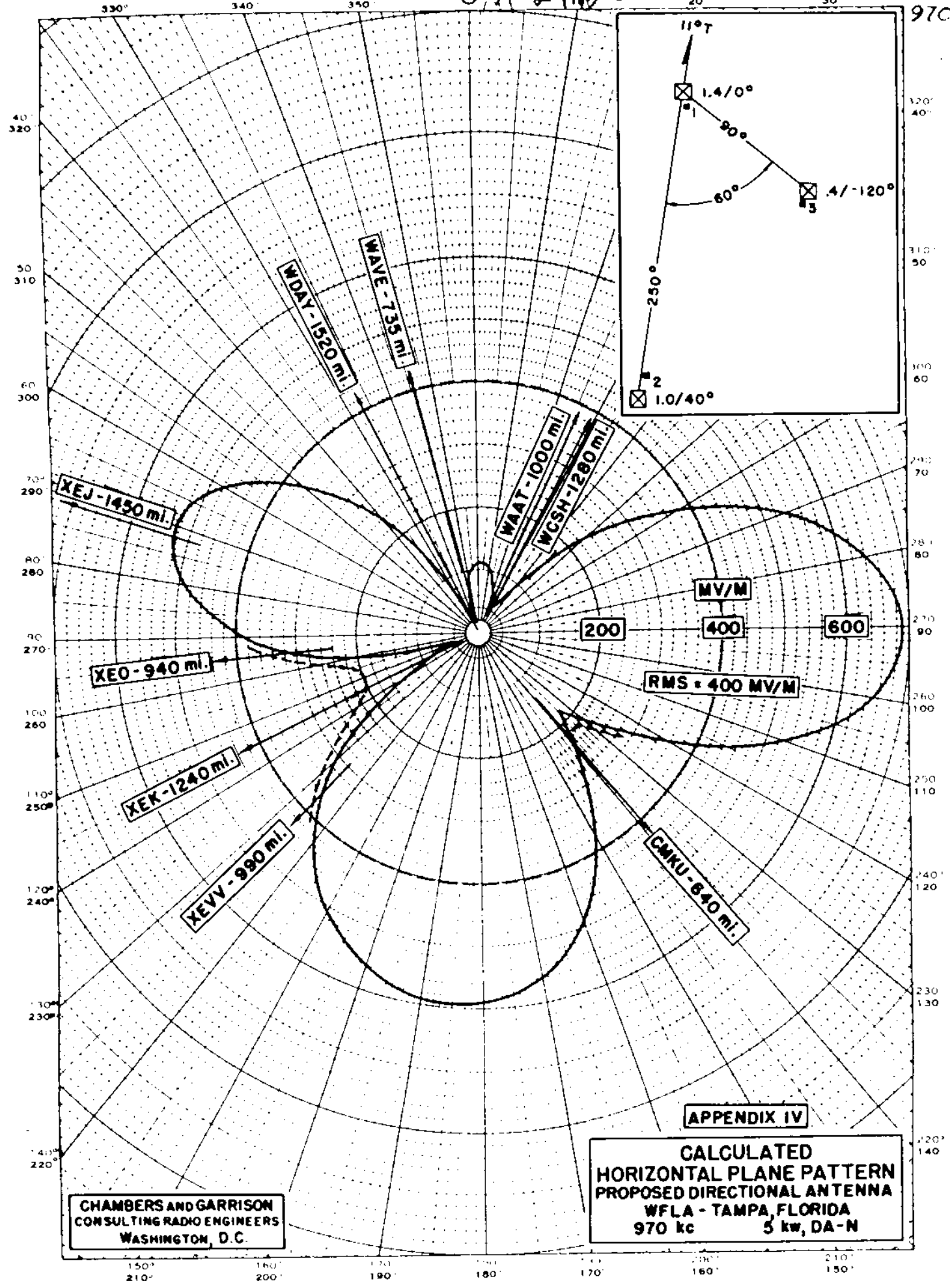


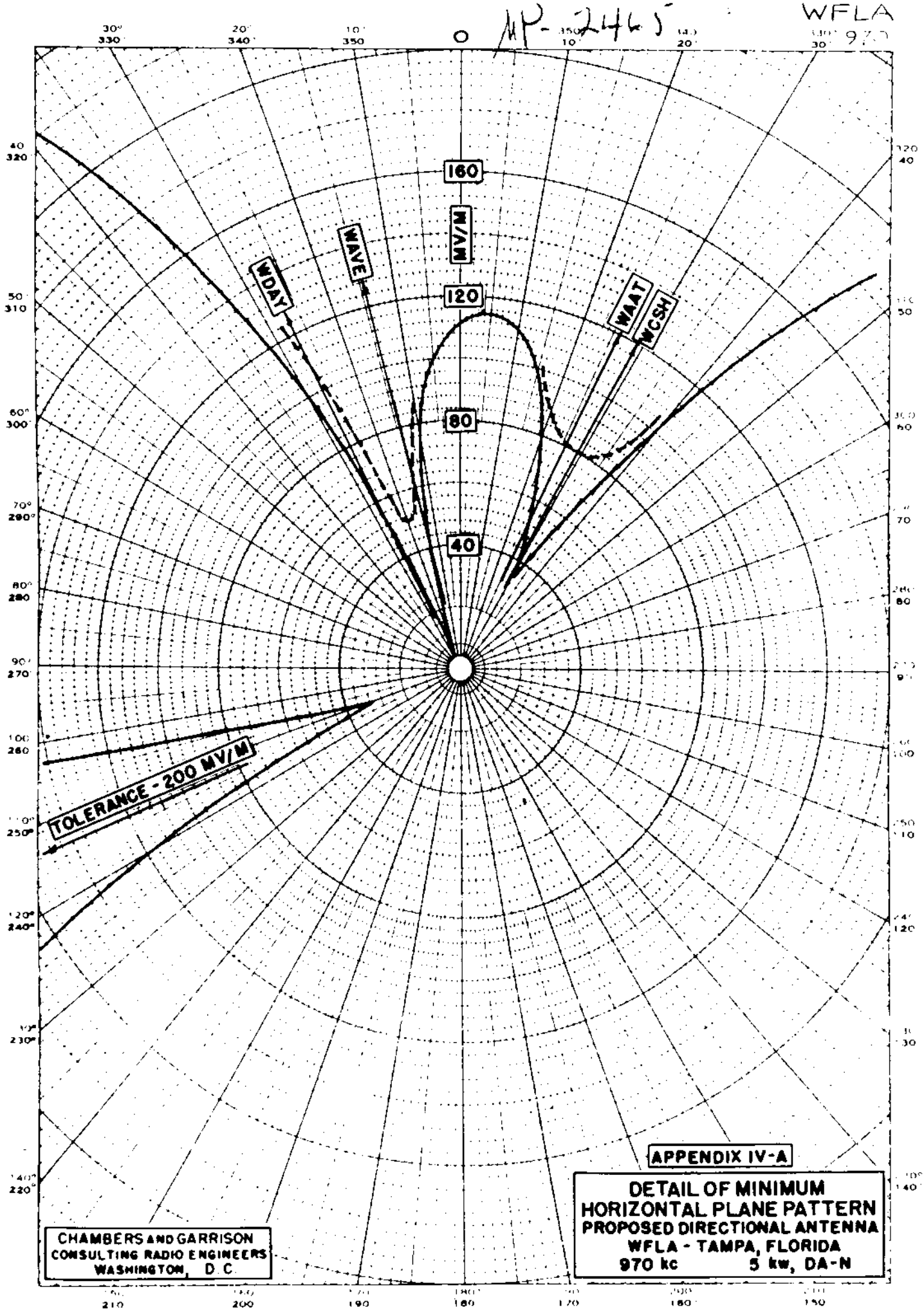
FIGURE 13
PROPOSED 60° VERTICAL RADIATION PATTERN
WFLA TAMPA, FLORIDA
SEPTEMBER 1975

WFLA

WFLA

970


11°T
1.4/0°
90°
60°
.4/-120°
250°
1.0/40°
WAVE - 735 mi.
WDAY - 1520 mi.
WAAT - 1000 mi.
WCSH - 1280 mi.
XEJ - 1450 mi.
XEO - 940 mi.
XEK - 1240 mi.
XEVV - 990 mi.
CMKU - 840 mi.
MV/M
200
400
600
RMS = 400 MV/M
APPENDIX IV
CALCULATED
HORIZONTAL PLANE PATTERN
PROPOSED DIRECTIONAL ANTENNA
WFLA - TAMPA, FLORIDA
970 kc 5 kw, DA-N
CHAMBERS AND GARRISON
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.


WFLA
970
160
MV/M
120
80
40
WDAY
WAVE
WAAT
WCSH
TOLERANCE - 200 MV/M
CHAMBERS AND GARRISON
CONSULTING RADIO ENGINEERS
WASHINGTON, D C
APPENDIX IV-A
DETAIL OF MINIMUM
HORIZONTAL PLANE PATTERN
PROPOSED DIRECTIONAL ANTENNA
WFLA - TAMPA, FLORIDA
970 kc 5 kw, DA-N

~~WTAM~~
WIIN

PROPOSED DAY
(6/26/57g)

Station WTAM
Atlanta, Georgia

5kw, DA-D,D
970 KC

Granted Mod of CP 6/20/57 to change Radio location

Granted Mod of CP (3/17/58) to change transm location (see below) This mod also corrects the height above sea level to 1160 ft.

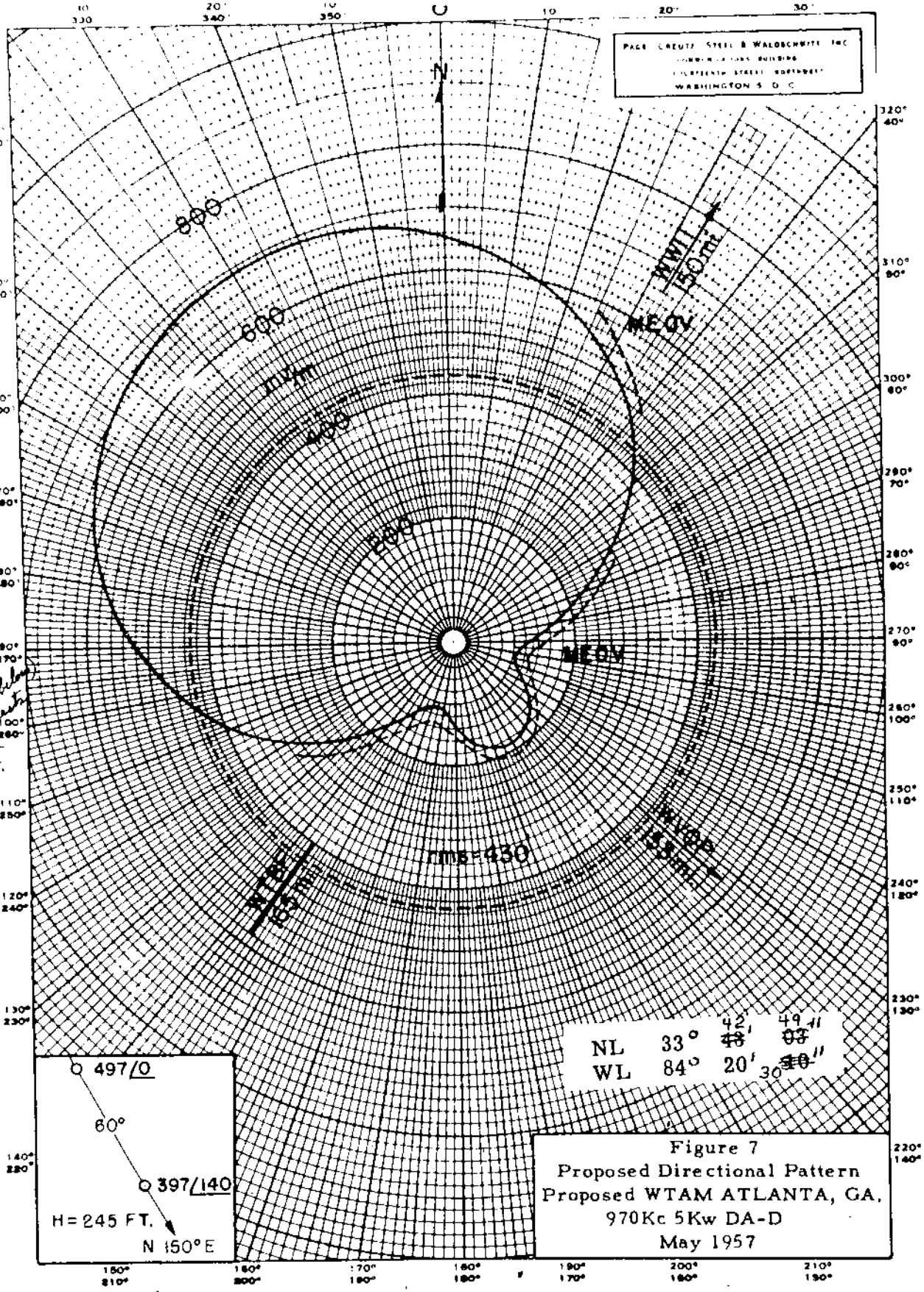


Figure 7
Proposed Directional Pattern
Proposed WTAM ATLANTA, GA.
970Kc 5Kw DA-D
May 1957

FCC File No. BMP-7628
Accepted

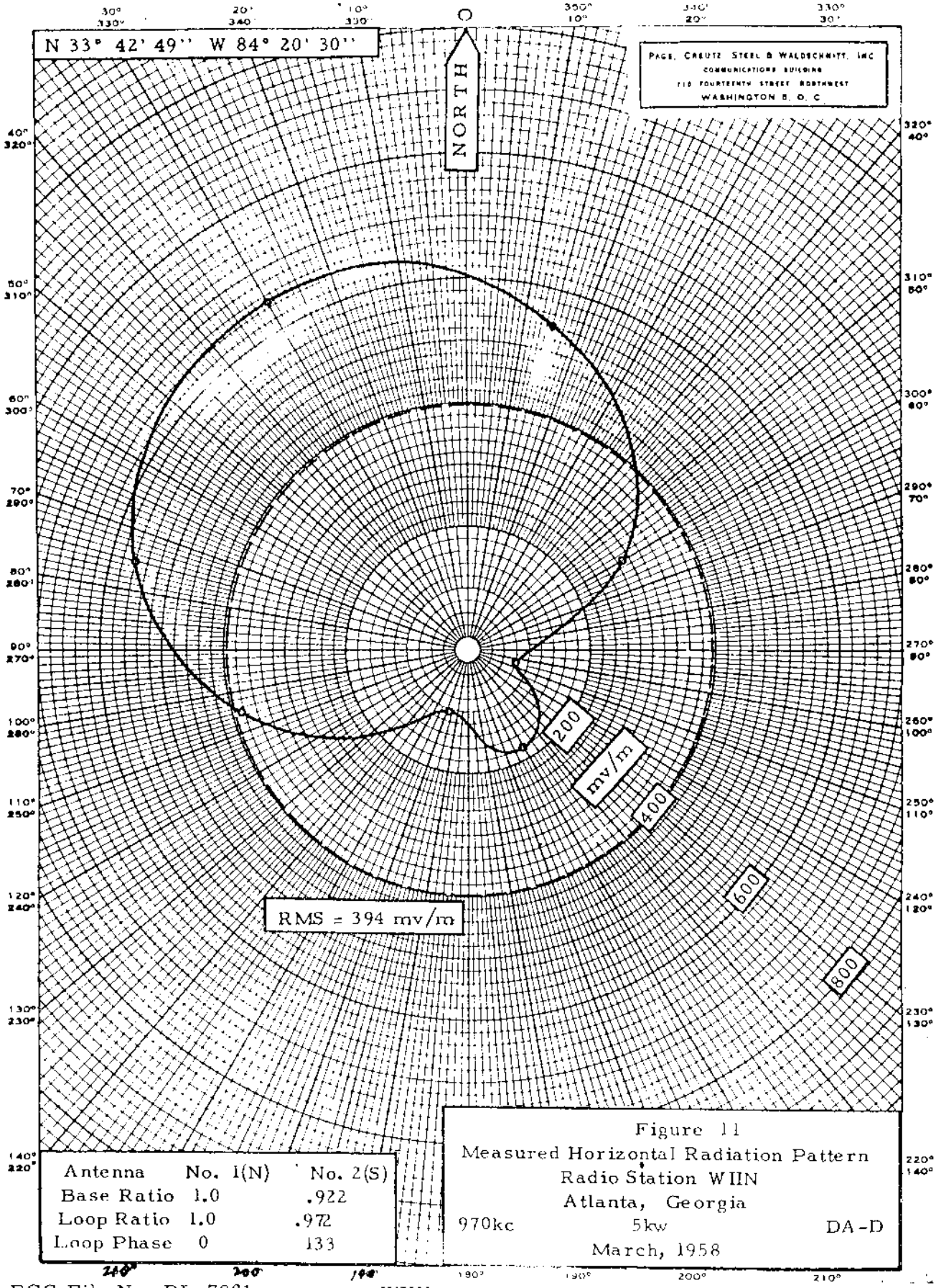
WTAM
Atlanta, Georgia

970 KC

MEASURED DAY
(4-9-58g)

Station WIIN
Atlanta, Georgia

5kw, DA-D,D
970 KC



Antenna	No. 1(N)	No. 2(S)
Base Ratio	1.0	.922
Loop Ratio	1.0	.972
Loop Phase	0	133

Figure 11
Measured Horizontal Radiation Pattern
Radio Station WIIN
Atlanta, Georgia
970kc 5kw DA-D
March, 1958

FCC File No. BL-7061
Accepted 3-21-58

WIIN
Atlanta, Georgia

970 KC

MEASURED NON-DA
(4-9-58g)

Station WIIN
Atlanta, Georgia

5kw, DA-D,D
970 KC

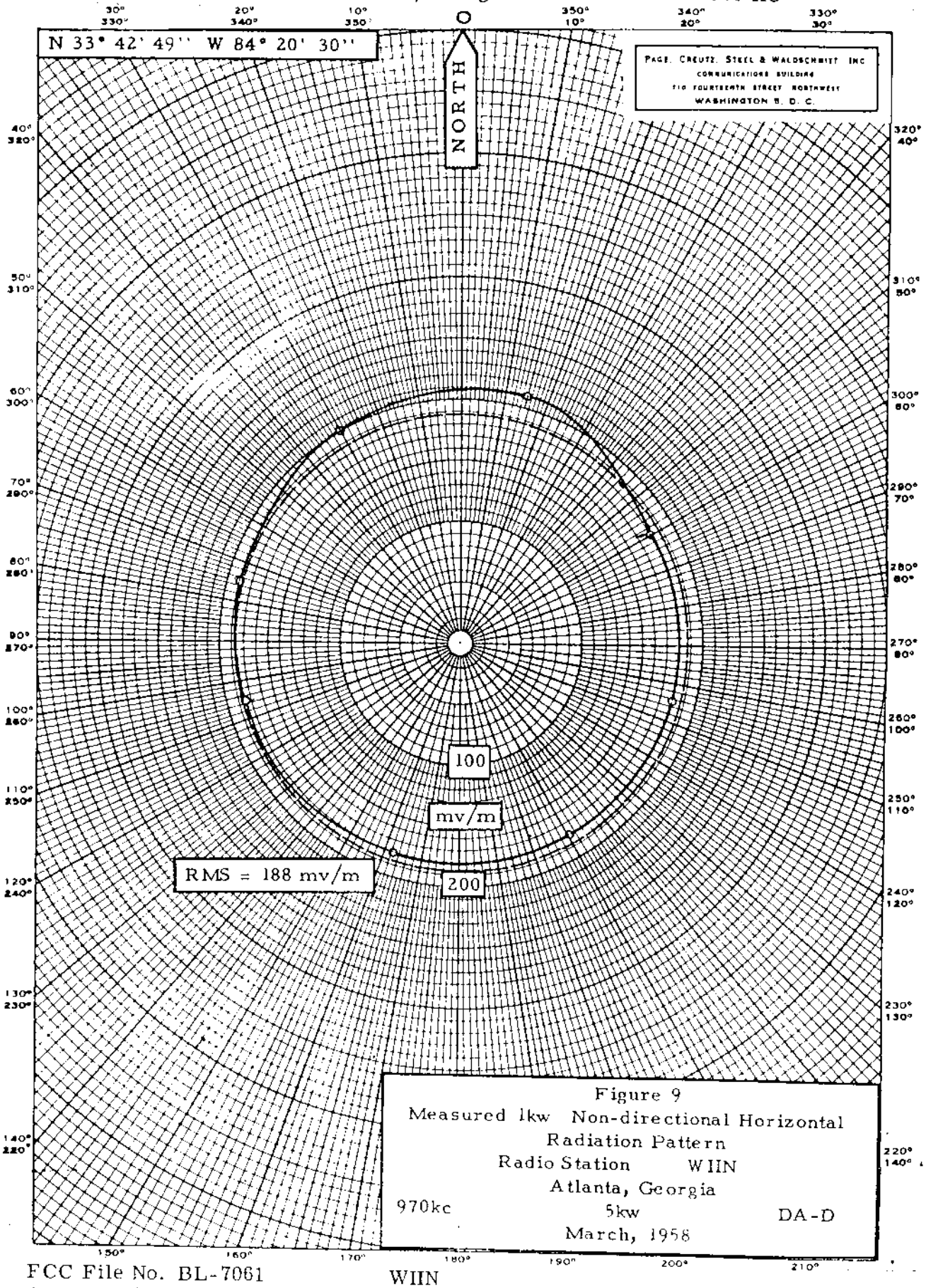


Figure 9
Measured 1kw Non-directional Horizontal
Radiation Pattern
Radio Station WIIN
Atlanta, Georgia
970kc 5kw DA-D
March, 1958

FCC File No. BL-7061
Accepted 3-31-58

WIIN
Atlanta, Georgia

970 KC

WJMX

PROPOSED NIGHT — WJMX, FLORENCE, S. C. — 1kw, 5kw-LS, DAN — 970 kc

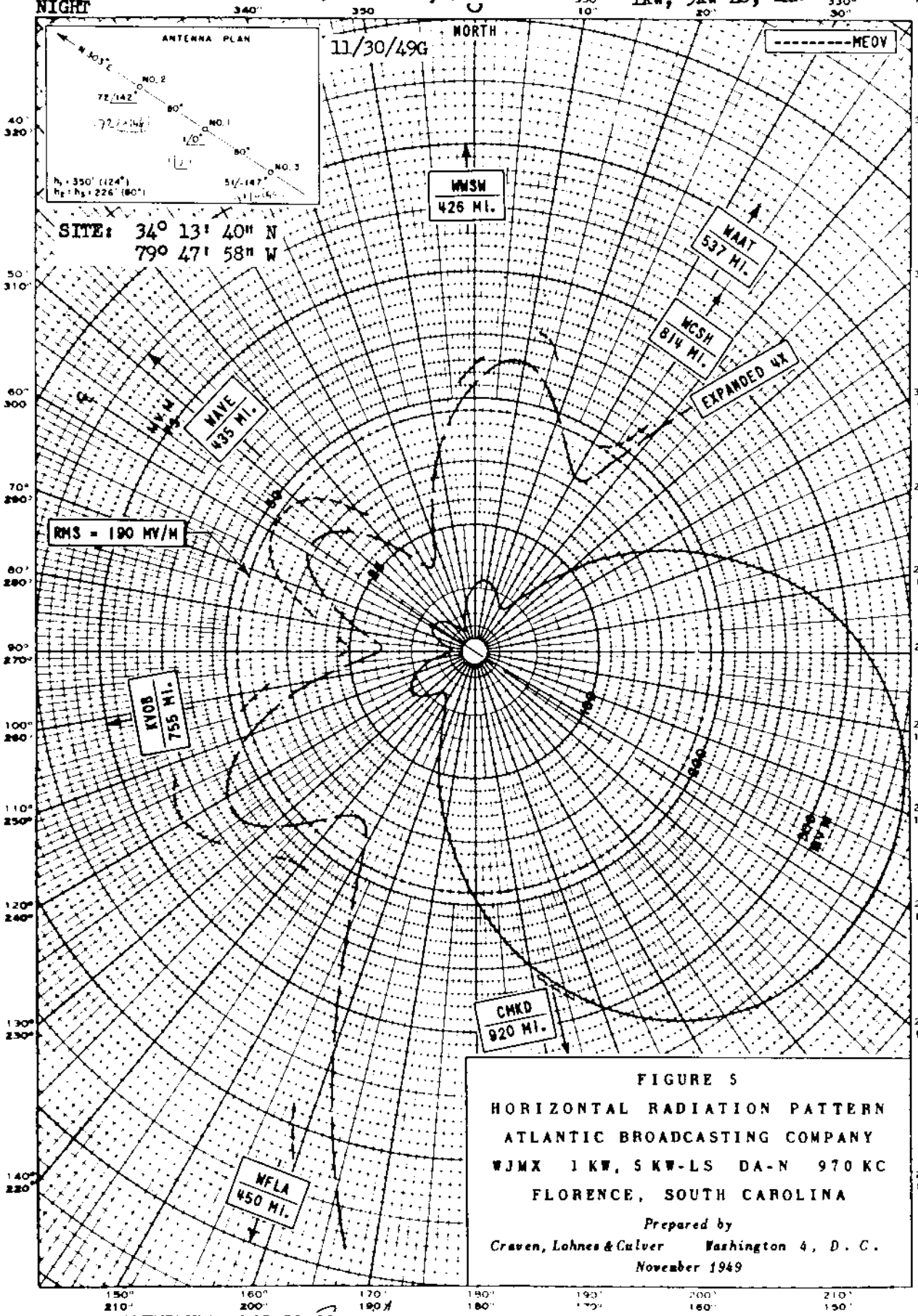


FIGURE 5
HORIZONTAL RADIATION PATTERN
ATLANTIC BROADCASTING COMPANY
WJMX 1 KW, 5 KW-LS DA-N 970 KC
FLORENCE, SOUTH CAROLINA

Prepared by
Craven, Lohnes & Culver Washington 4, D. C.
November 1949

AMENDMENT RECD 11-21-49 BP-7024

WJMX, Florence, S. C. 970 kc

WJMX

MEASURED NIGHT — WJMX, FLORENCE, S. C. — 1kw,5kw-LS,DAN — 970 kc

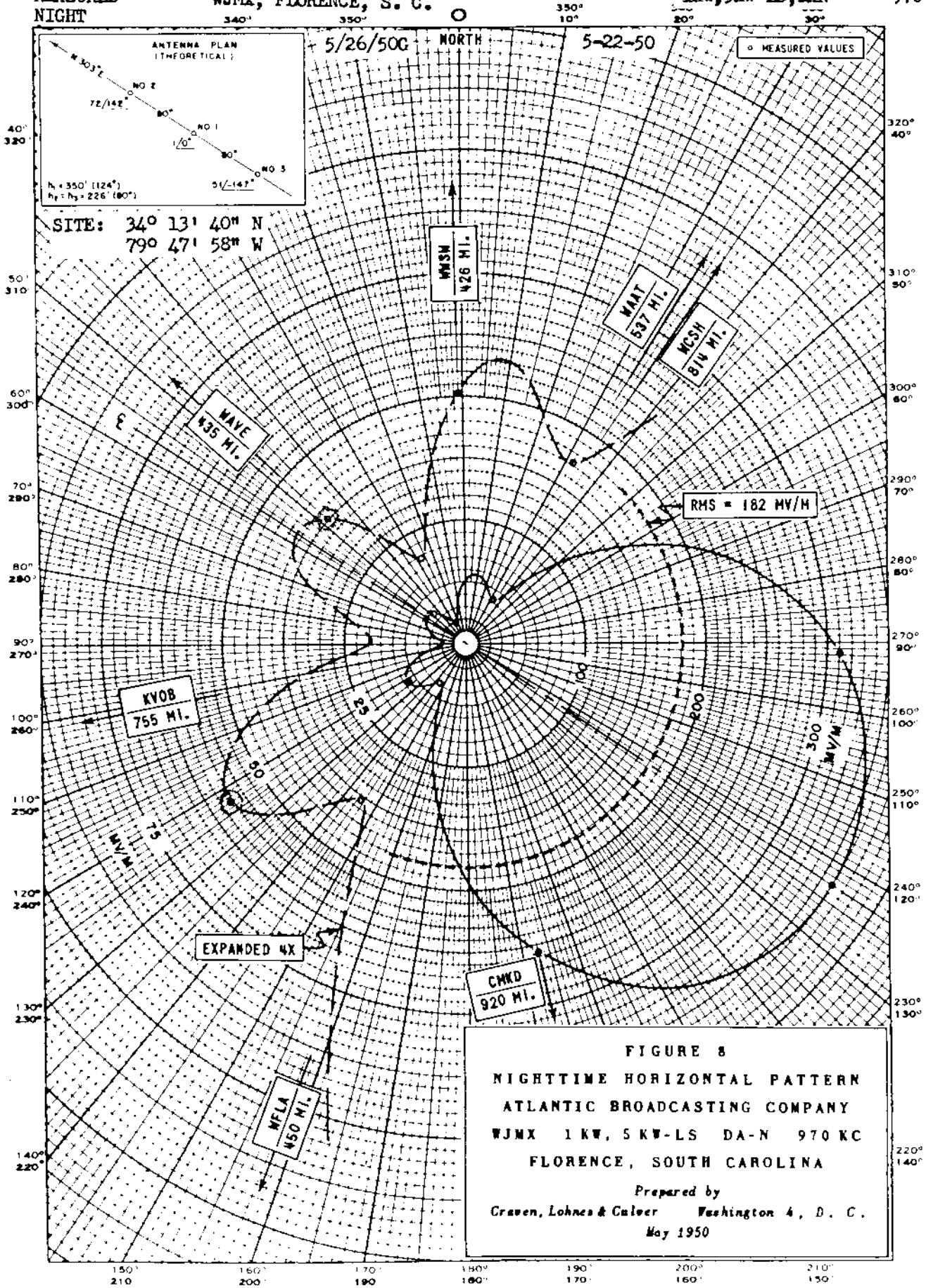


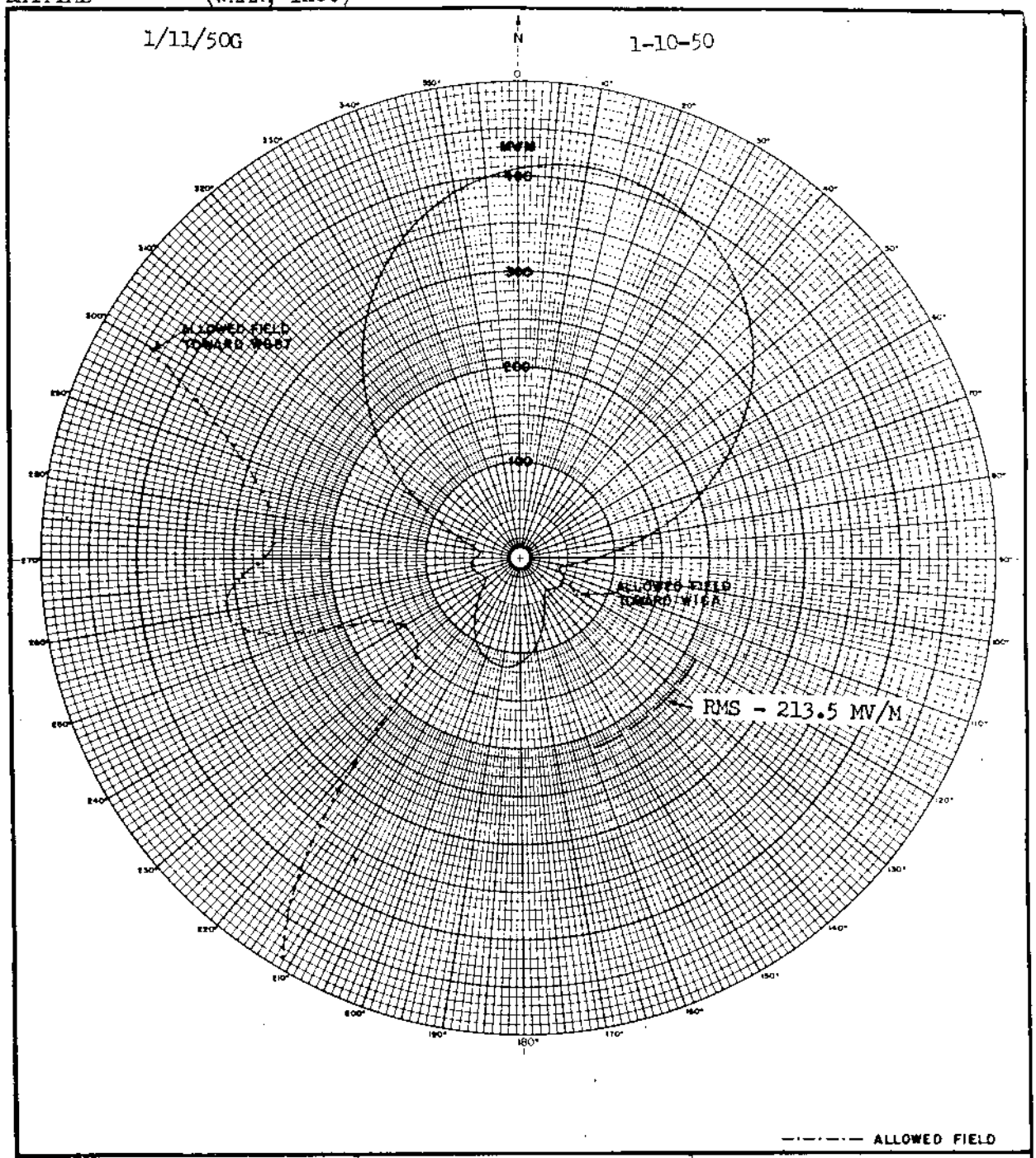
FIGURE 8
NIGHTTIME HORIZONTAL PATTERN
ATLANTIC BROADCASTING COMPANY
WJMX 1 KW, 5 KW-LS DA-N 970 KC
FLORENCE, SOUTH CAROLINA

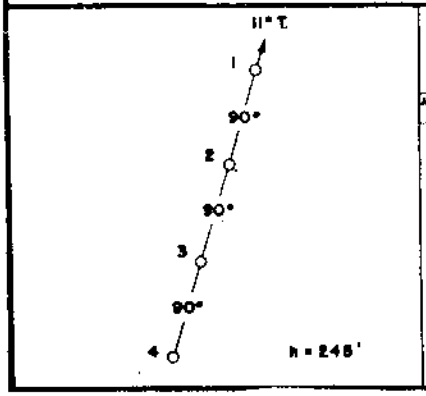
Prepared by
Craven, Lohnes & Culver Washington 4, D. C.
May 1950

WJMX, Florence, S. C. 970 kc

WKHM
Jackson, Mich.

PROPOSED DAYTIME — NEW, JACKSON, MICH. (WKMH, Inc.) — 1kw, DA-2 — 970 kc





LATITUDE 42° 11' 39"
LONGITUDE 84° 25' 50"

ANTENNA NUMBER	AZIMUTH DEG.	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
1	SEE	SEE	32	1	180	87
2			170.5	1.625	180	87
3	DIAGRAM	DIAGRAM	— 32	1	180	87
4			—	—	—	—

CALCULATED DAYTIME HORIZONTAL PLANE PATTERN FOR PROPOSED STATION
JACKSON, MICHIGAN
970KC. 1KW U, DA-2

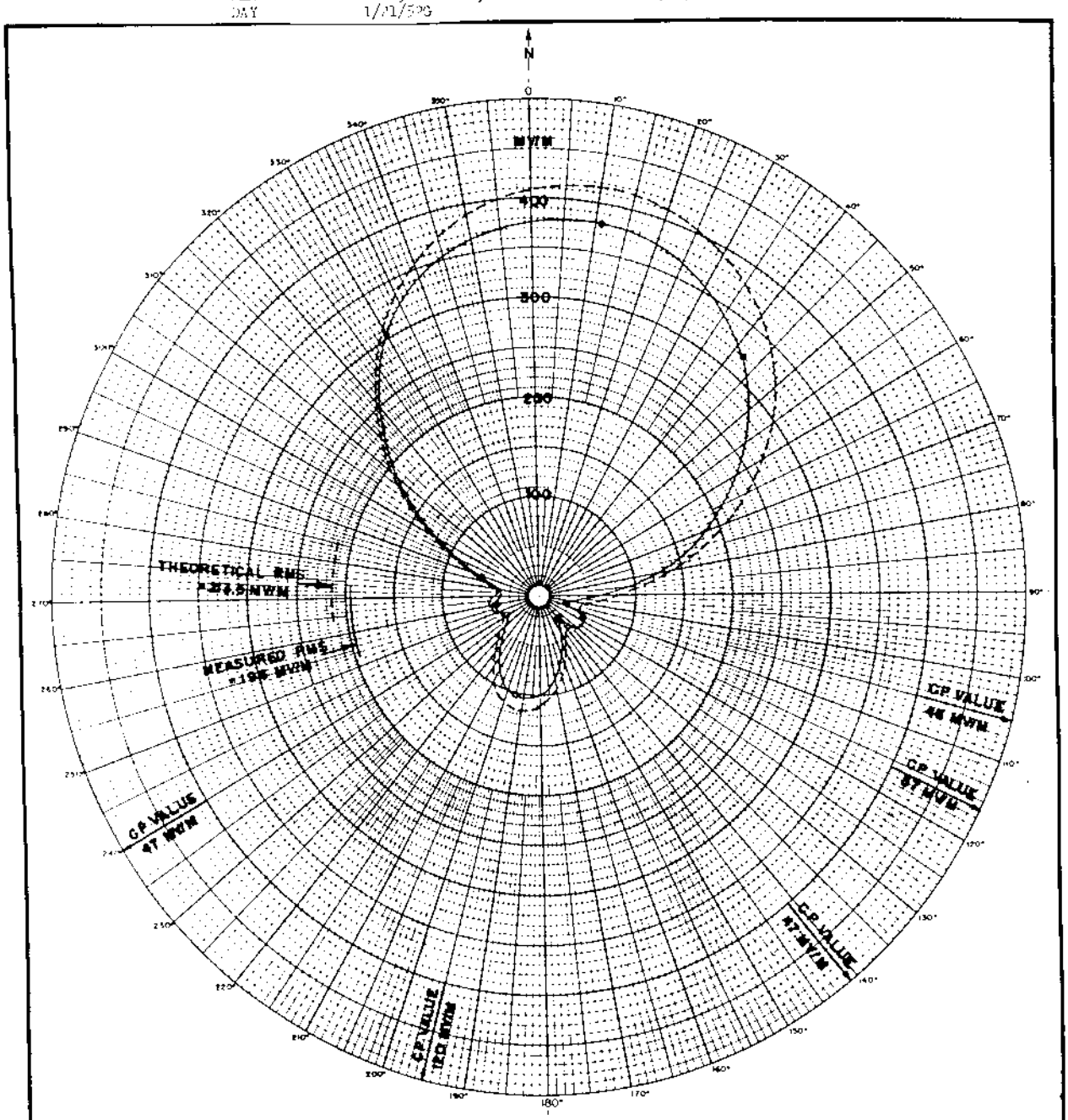
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

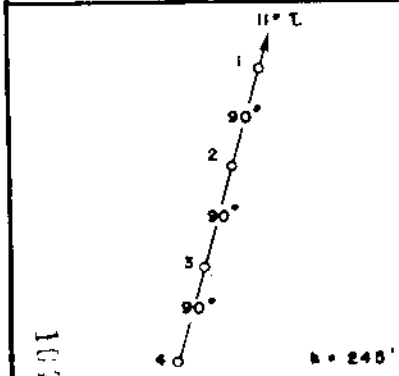
491229.

NEW, Jackson, Mich. 970 kc

WKHM

MEASURED DAY — WKHM, JACKSON, MICH. 1/21/59 — 1 KW, U, DA-2 — 970 KC





LATITUDE 42° 11' 39"
LONGITUDE 84° 25' 50"

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
1	SEE DIAGRAM	SEE DIAGRAM	32	1	180	87
2			170.5	1.825	180	87
3			— 32	1	180	87
4			—	—	—	—

MEASURED DAYTIME, HORIZONTAL PLANE PATTERN

WKHM

JACKSON, MICHIGAN

970 KC. 1 KW. U, DA-2

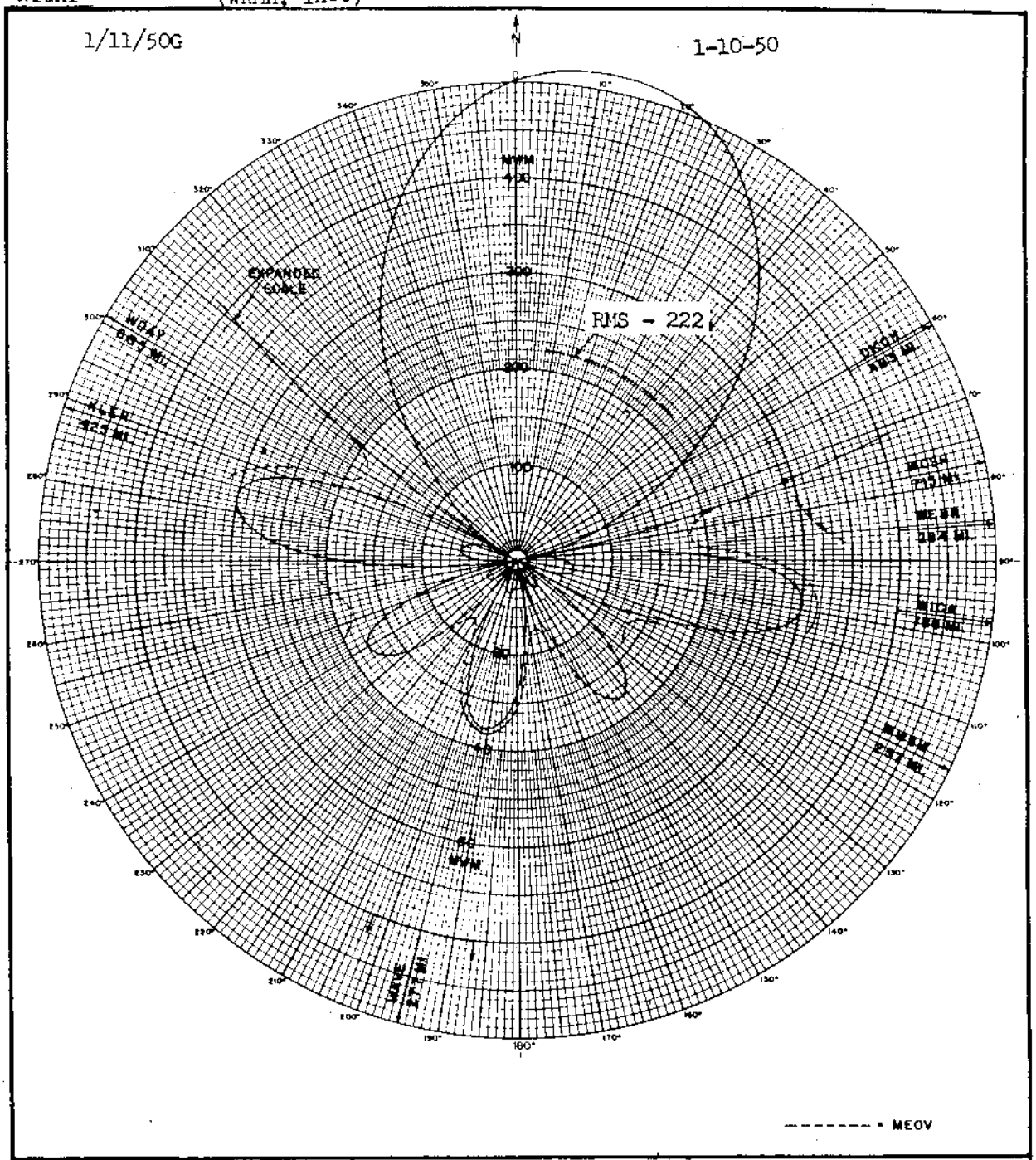
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

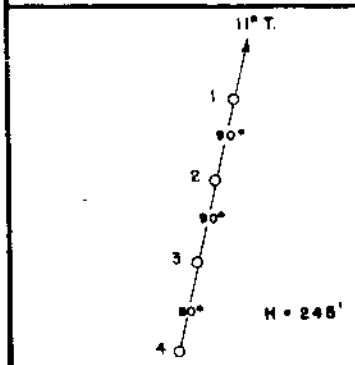
511120

APPL. RECD 11/27/51 ADD 1/21/52 PL-4642 — WKHM, JACKSON, MICH. — 970 KC

WKHM
JACKSON, MICH.

PROPOSED NIGHT | NEW, JACKSON, MICH. (WKMH, Inc.) | 1kw, DA-2 | 970 kc





LATITUDE 42° 11' 39"
LONGITUDE 84° 25' 50"

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
1	SEE	SEE	0	1	180	87
2			150.7°	2.11	180	87
3	DIAGRAM	DIAGRAM	-55.2°	2.11	180	87
4			95.5°	1	180	87

CALCULATED NIGHTTIME HORIZONTAL PLANE PATTERN
FOR
PROPOSED STATION
JACKSON, MICHIGAN
970 KC. 1KW U, DA-2

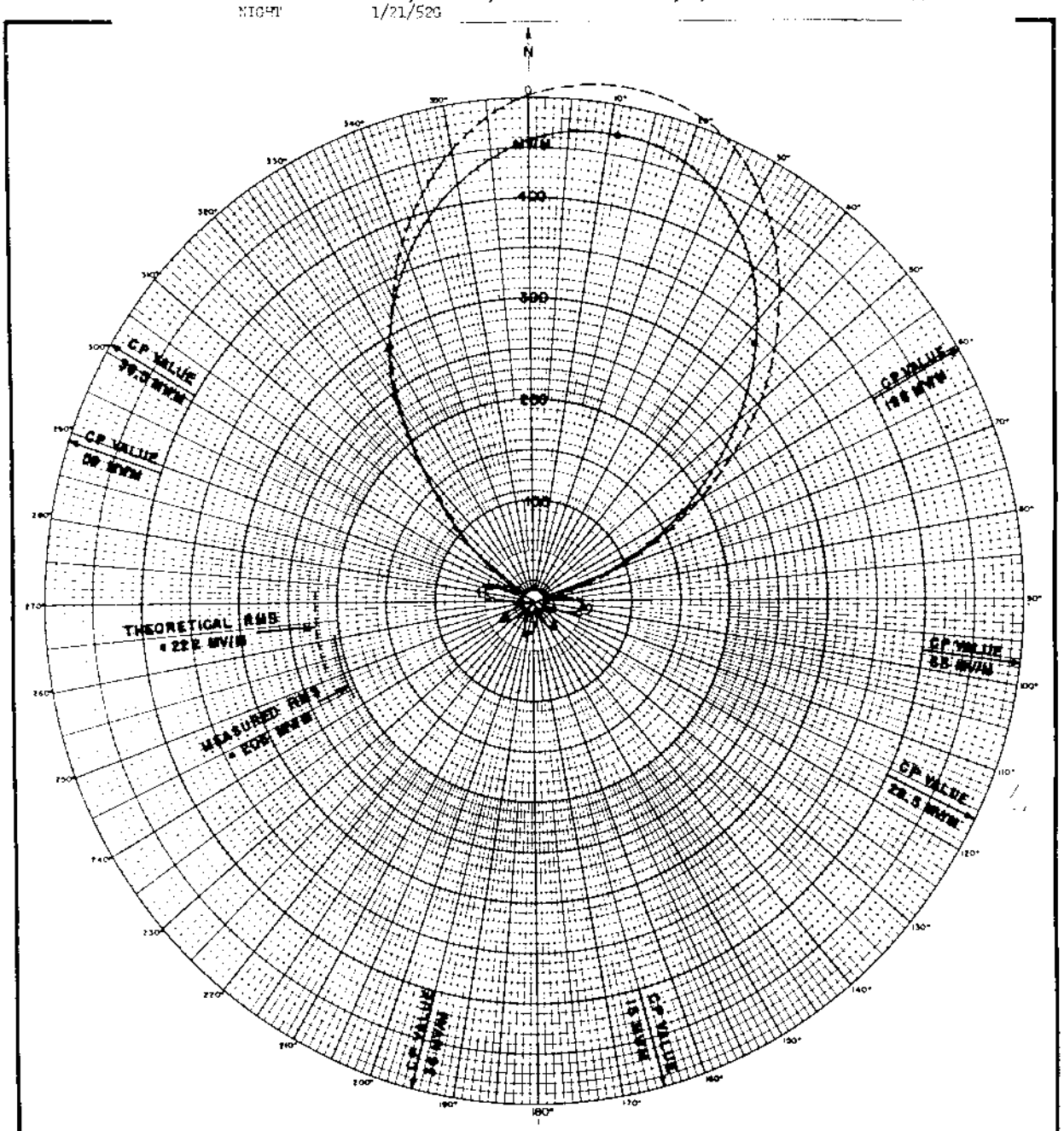
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

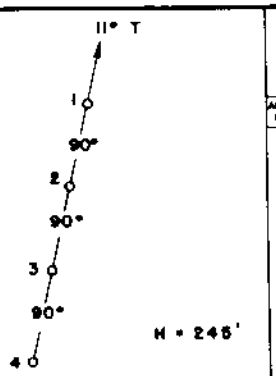
491221.

NEW, Jackson, Mich. 970 kc

WKHM

MEASURED WKHM, JACKSON, MICH. 1 KW, U, DA-2 970 KC
NIGHT 1/21/52G





LATITUDE 42° 11' 39"
LONGITUDE 84° 25' 50"

ANTENNA NUMBER	AZIMUTH DEG.	SPACING DEG	PHASING DEG.	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG.
1	SEE DIAGRAM	SEE DIAGRAM	0	1	180	87
2			150.7	2.11	180	87
3			-55.2	2.11	180	87
4			95.5	1	180	87

MEASURED NIGHTTIME
HORIZONTAL PLANE PATTERN
WKHM

JACKSON, MICHIGAN
970 KC. 1 KW. U,DA-2

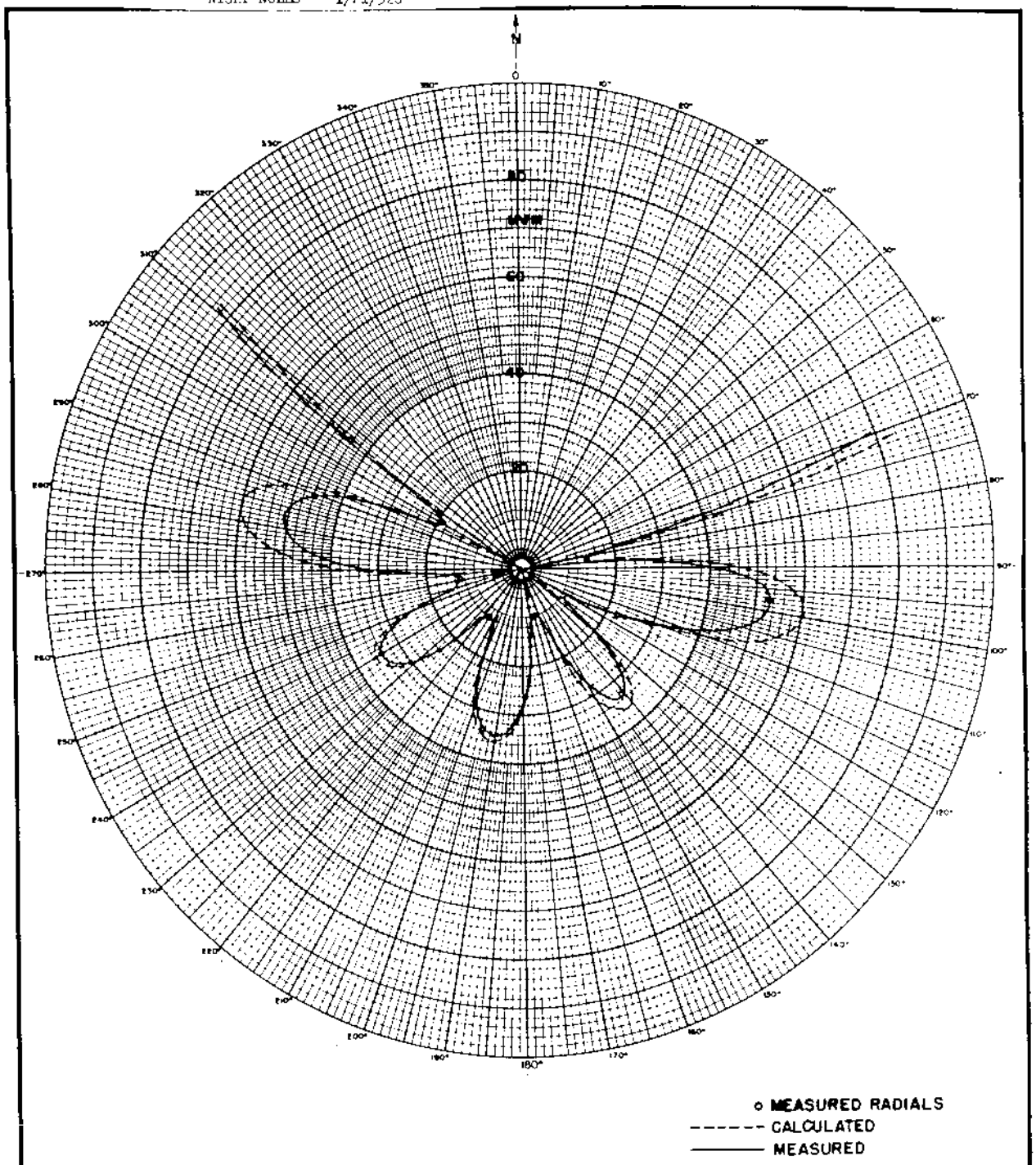
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D. C.

511120

APPL RECD 11/27/51 ACC 1/14/52 BL-4642 WKHM, JACKSON, MICH. 970 KC

WKHM

MEASURED NIGHT NULLS — WKHM, JACKSON, MICH. — 1/21/52G — 1 KW, U, DA-2 — 970 KC



LATITUDE
LONGITUDE

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG

EXPANDED SCALE
MEASURED NIGHTTIME
HORIZONTAL PLANE PATTERN
WKHM
JACKSON, MICHIGAN
970 KC. 1 KW. U, DA-2

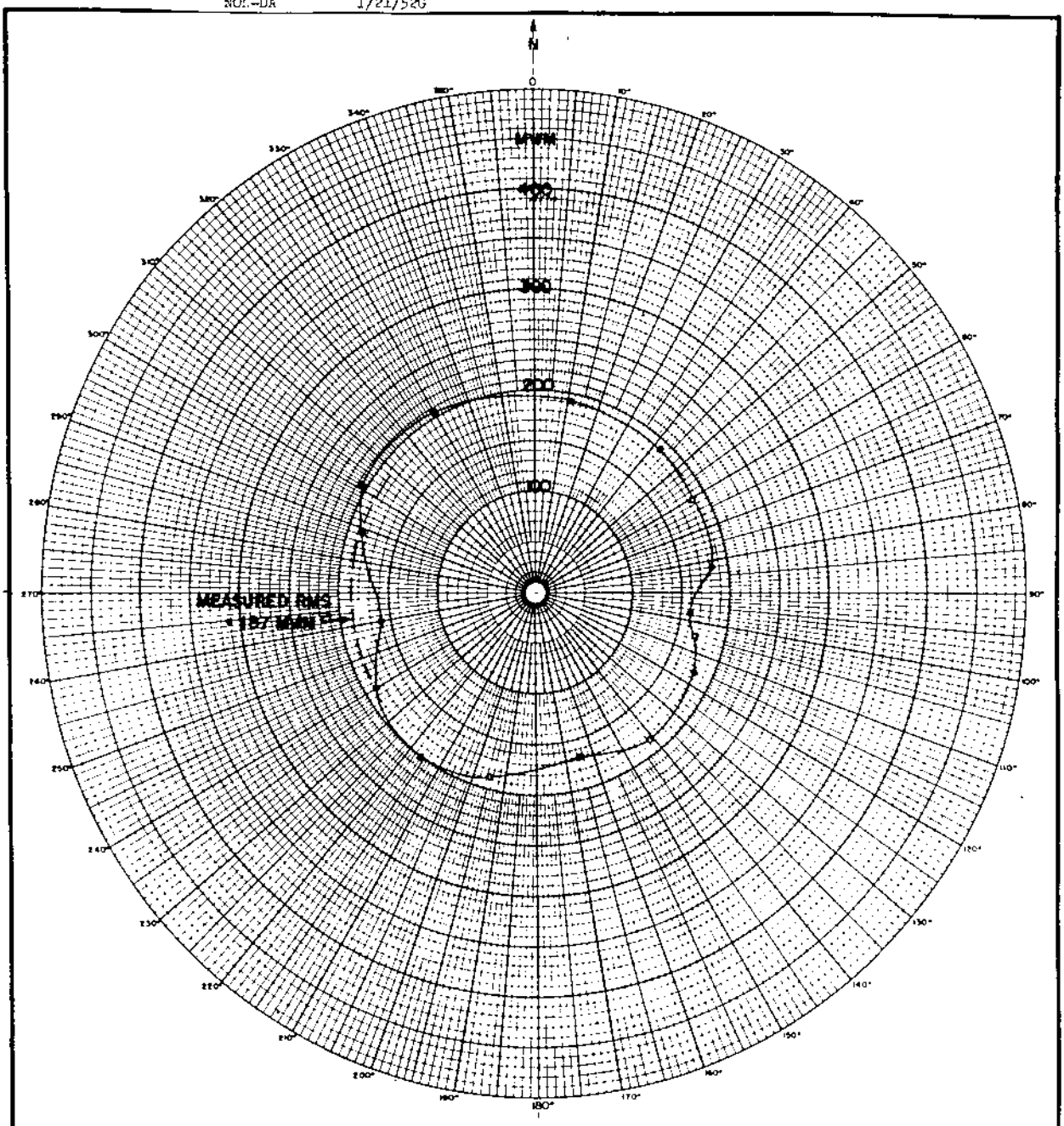
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D C

81120

APPL. BASD 11/27/51 ASC 1/21/52 BL-4602 — WKHM, JACKSON, MICH. — 970 KC

WKHM

MEASURED WKHM, JACKSON, MICHIGAN 1 KW, U, DA-2 970 KC
NON-DA 1/21/52G



o MEASURED RADIALS

LATITUDE
LONGITUDE

ANTENNA NUMBER	AZIMUTH DEG.	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG

MEASURED 1000 WATT
NON-DIRECTIONAL PATTERN
ANTENNA NO. 2
WKHM
JACKSON, MICHIGAN
970 KC. 1 KW. U, DA-2

KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D. C.

511120

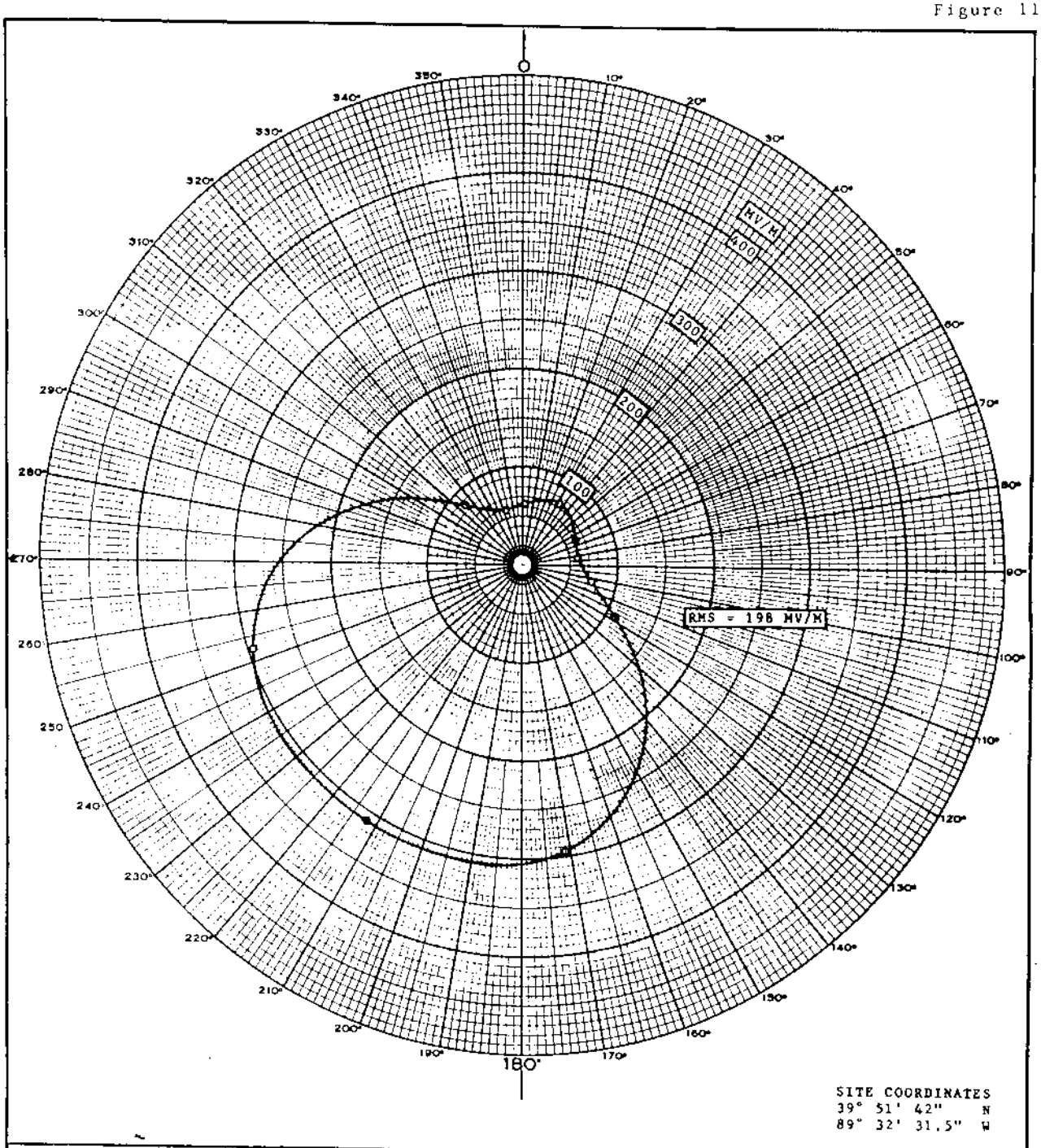
APPL RECD 11/27/51 ACC 1/11/52 BL-1612 WKHM, JACKSON, MICHIGAN 970 KC

Measured Day
(8-24-62ct)

Station WMAY
Springfield, Illinois

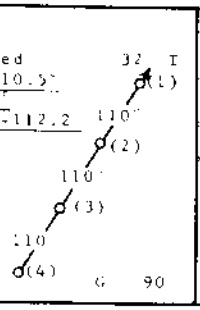
500w,1kw-LS,DA-2,U
970 kc

Figure 11



MEASURED DAYTIME DIRECTIONAL HORIZONTAL PLANE RADIATION PATTERN

(1) Not used
(2) 1.18/110.5°
(3) 1.00/0°
(4) 0.288/-112.2



LINCOLN BROADCASTING COMPANY, INC.
SPRINGFIELD, ILLINOIS

Jules Cohen
Consulting Electronic Engineer

RADIO STATION WMAY
970 KC
0.5 KW 1 KW-LS U DA-2
Pattern 620712

FCC File No.BL-9516
Accepted 8-9-62

Station WMAY
Springfield, Illinois

970 kc

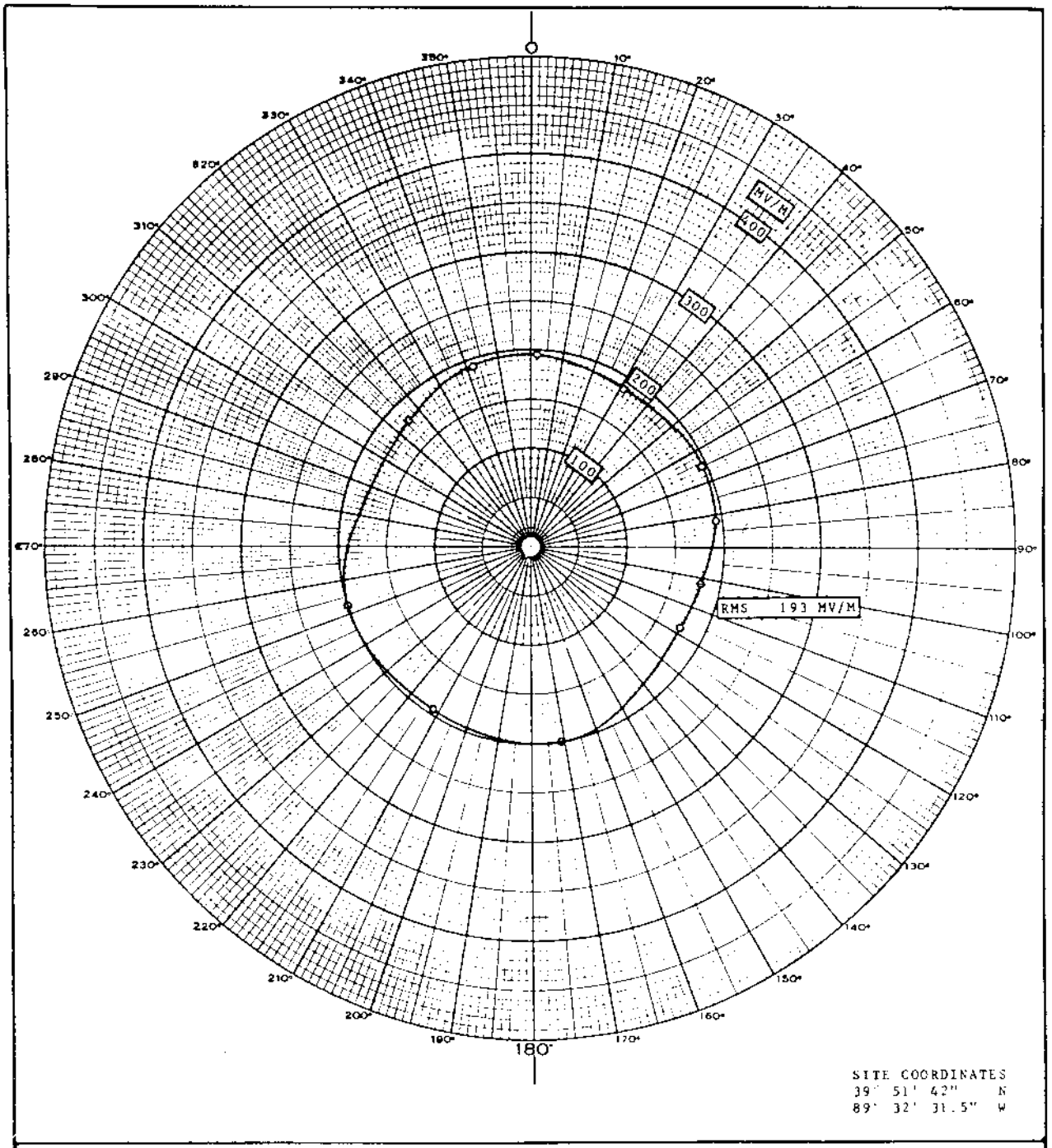
WMAY

Measured Non-DA
(8-24-62ct)

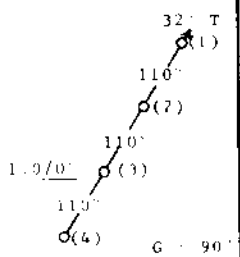
Station WMAY
Springfield, Illinois

500w,1kw-LS,DA-2,U
970 kc

Figure 9



MEASURED NONDIRECTIONAL HORIZONTAL PLANE RADIATION PATTERN



LINCOLN BROADCASTING COMPANY, INC.
SPRINGFIELD, ILLINOIS

Jules Cohen
Consulting Electronic Engineer

RADIO STATION WMAY
970 KC
0.5 KW 1 KW-LS U DA-2
July, 1962

FCC File NO.BL-9516
Accepted 8-9-62

Station WMAY
Springfield, Illinois

970 kc

WMAY

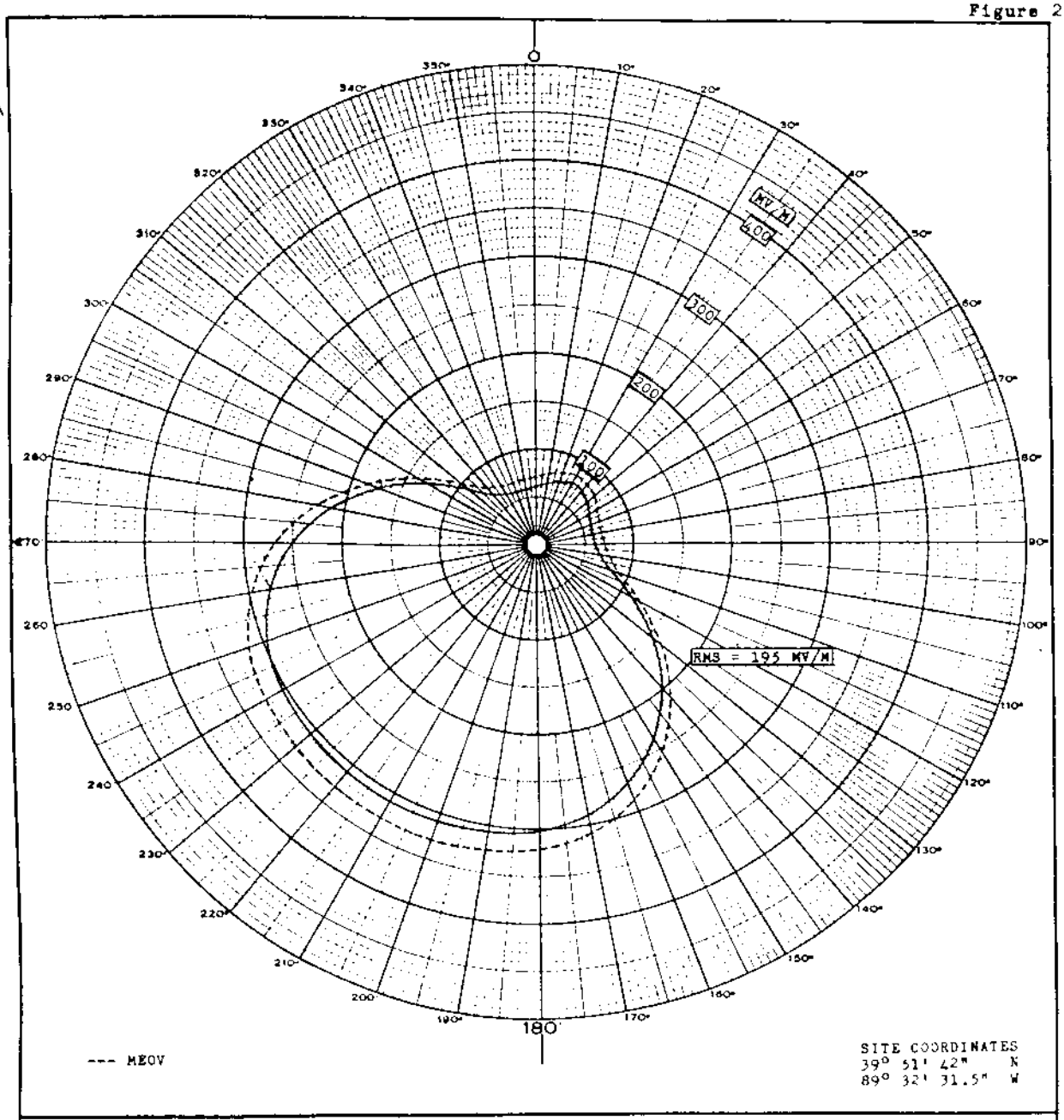
Proposed Day
(5-25-62ct)

Station WMAY
Springfield, Illinois

500w,1kw-LS,DA-2,U
970 kc

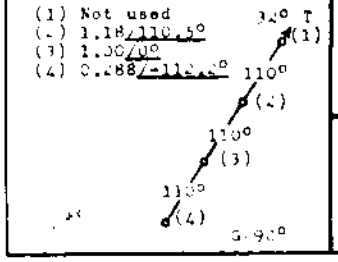
Figure 2

5-9-62
granted CP for
changes in day DA
pattern.



PROPOSED DAYTIME HORIZONTAL PLANE RADIATION PATTERN

(1) Not used
(2) 1.18/110.5°
(3) 1.00/0°
(4) 0.288/-113.5°



LINCOLN BROADCASTING COMPANY, INC.
SPRINGFIELD, ILLINOIS

Jules Cohen
Consulting Electronic Engineer

PROPOSED OPERATION
RADIO STATION WMAY
970 KC
0.5 KW 1 KW-LS U DA-2
Pattern 620301

FCC File No.BP-15481
Accepted 4-18-62

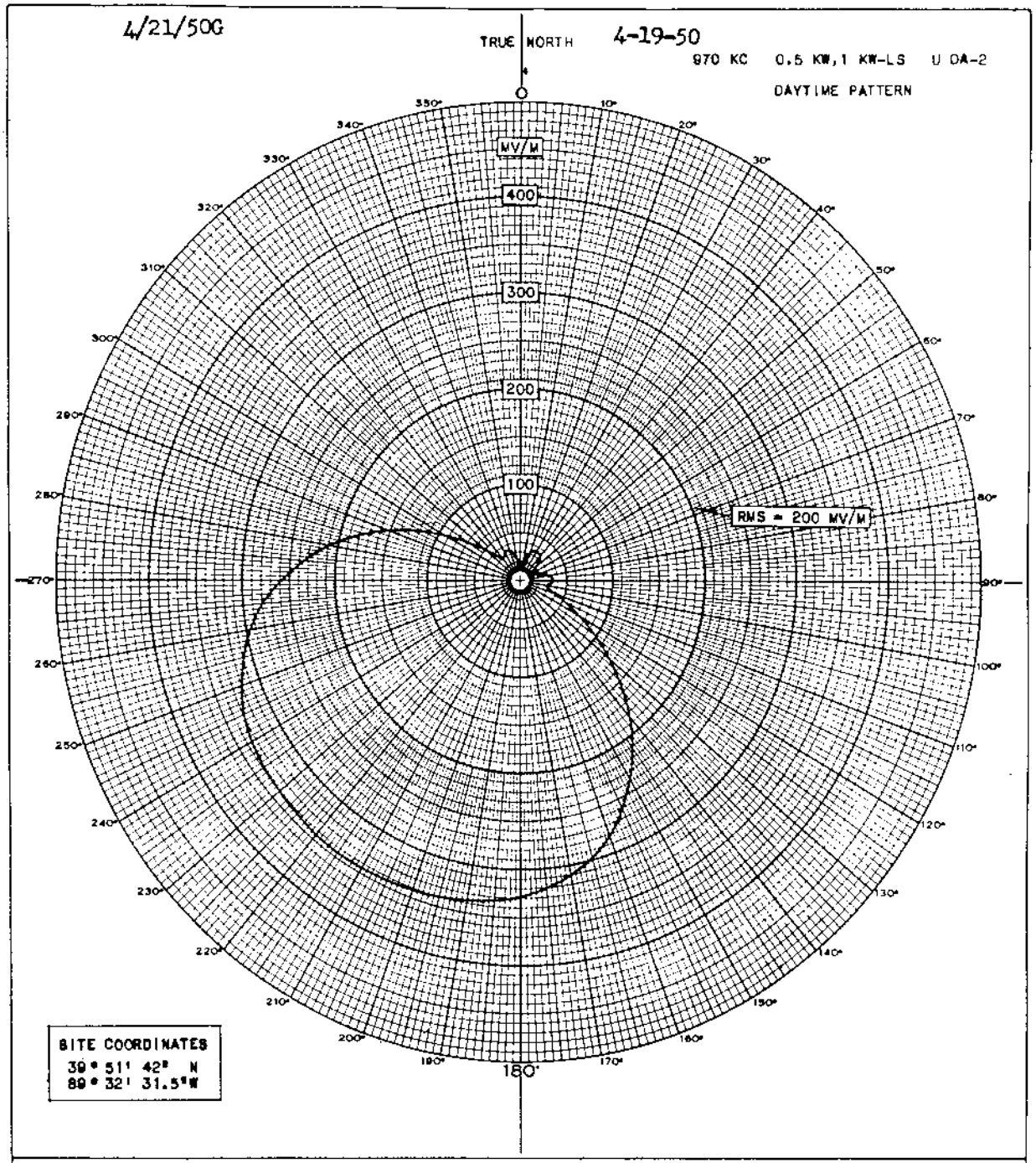
Station WMAY
Springfield, Illinois

970 kc

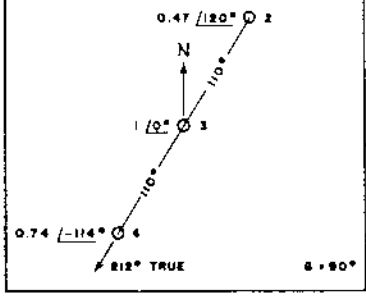
WMAY

PROPOSED DAYTIME WMAY, SPRINGFIELD, ILL. 500w,1kw-LS,DA-2 970 kc

FIGURE 7



CALCULATED HORIZONTAL PLANE RADIATION PATTERN FOR DAYTIME OPERATION



LINCOLN BROADCASTING COMPANY
SPRINGFIELD ILLINOIS

WELDON & CARR
CONSULTING RADIO ENGINEERS
WASHINGTON D.C. DALLAS TEXAS

PROPOSED NEW STATION
SPRINGFIELD ILLINOIS

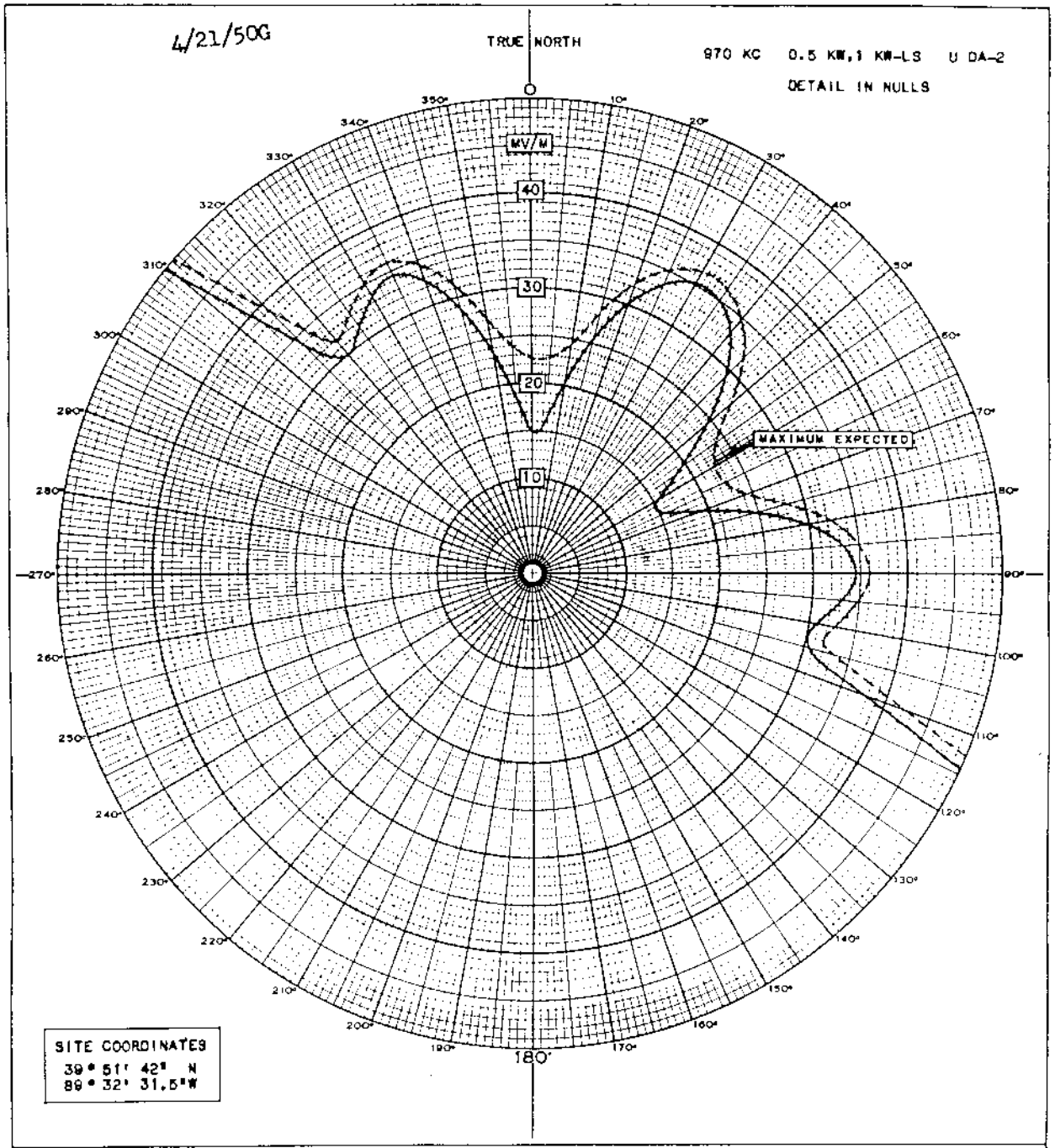
970 KC 0.5 KW,1 KW-LS U DA-2
W 500314 A

WMAY

PROPOSED DAY NULLS — WMAY, SPRINGFIELD, ILL. — 500w,1kw-LS,DA-2 — 970 kc

4-19-50

FIGURE B



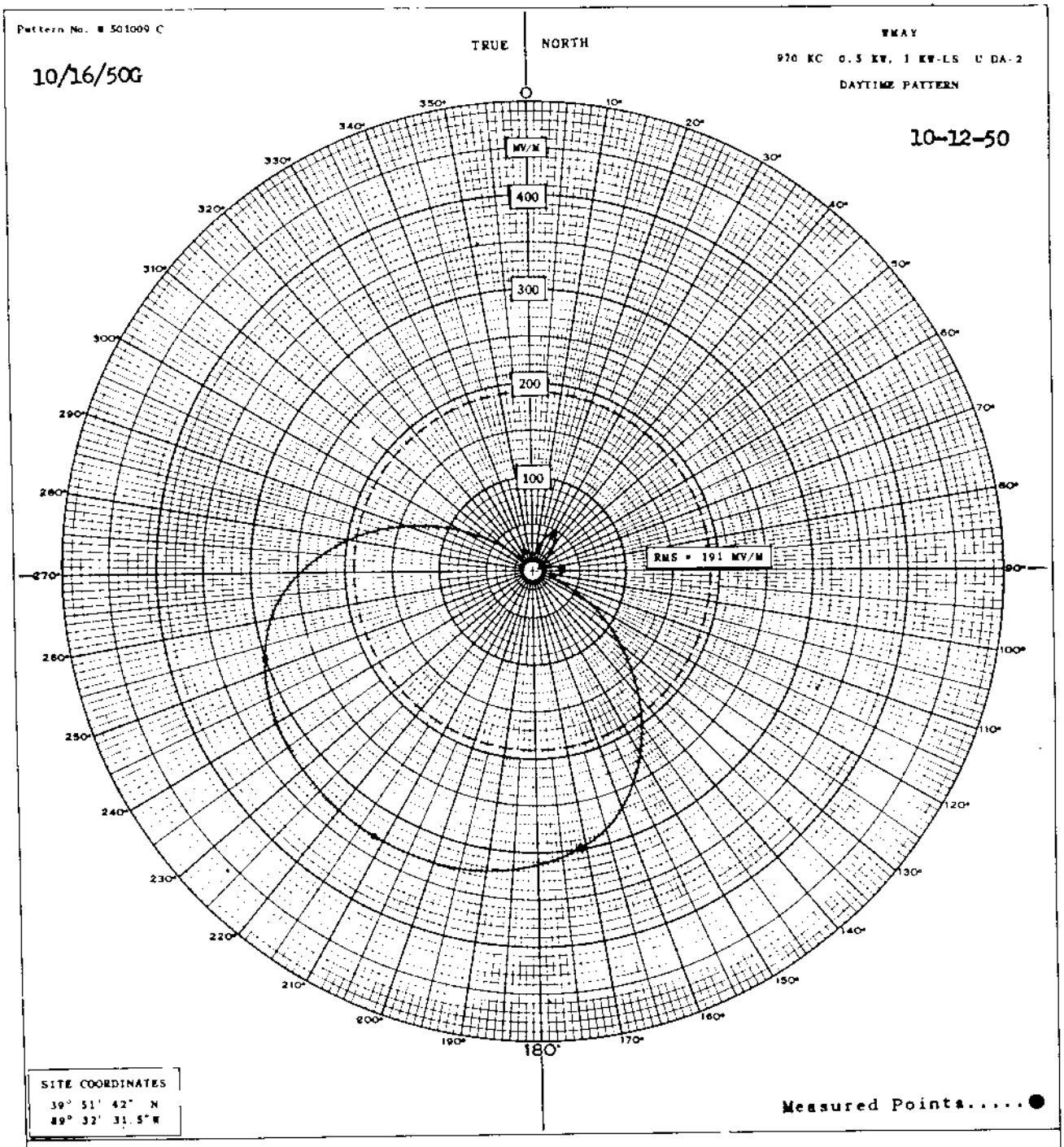
CALCULATED HORIZONTAL PLANE RADIATION PATTERN FOR DAYTIME OPERATION

DETAIL IN NULLS	LINCOLN BROADCASTING COMPANY SPRINGFIELD ILLINOIS	PROPOSED NEW STATION SPRINGFIELD ILLINOIS
	WELDON & CARR CONSULTING RADIO ENGINEERS WASHINGTON D.C. DALLAS TEXAS	970 KC 0.5 KW,1 KW-LS U DA-2 W 500314 B

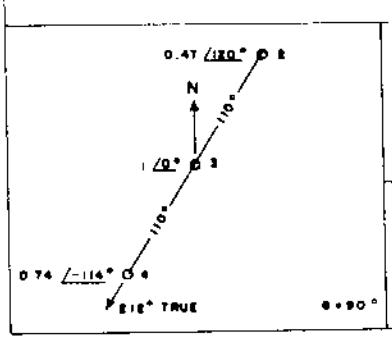
WMAY, Springfield, Ill. 970 kc

WMAY

MEASURED DAY | WMAY, SPRINGFIELD, ILL. | 500w, 1kw-LS, DA-2 | 970 kc



MEASURED DAYTIME HORIZONTAL PLANE RADIATION PATTERN



LINCOLN BROADCASTING COMPANY

WELDON & CARR *Consulting Radio Engineers*

Dallas Washington Seattle

Figure 14

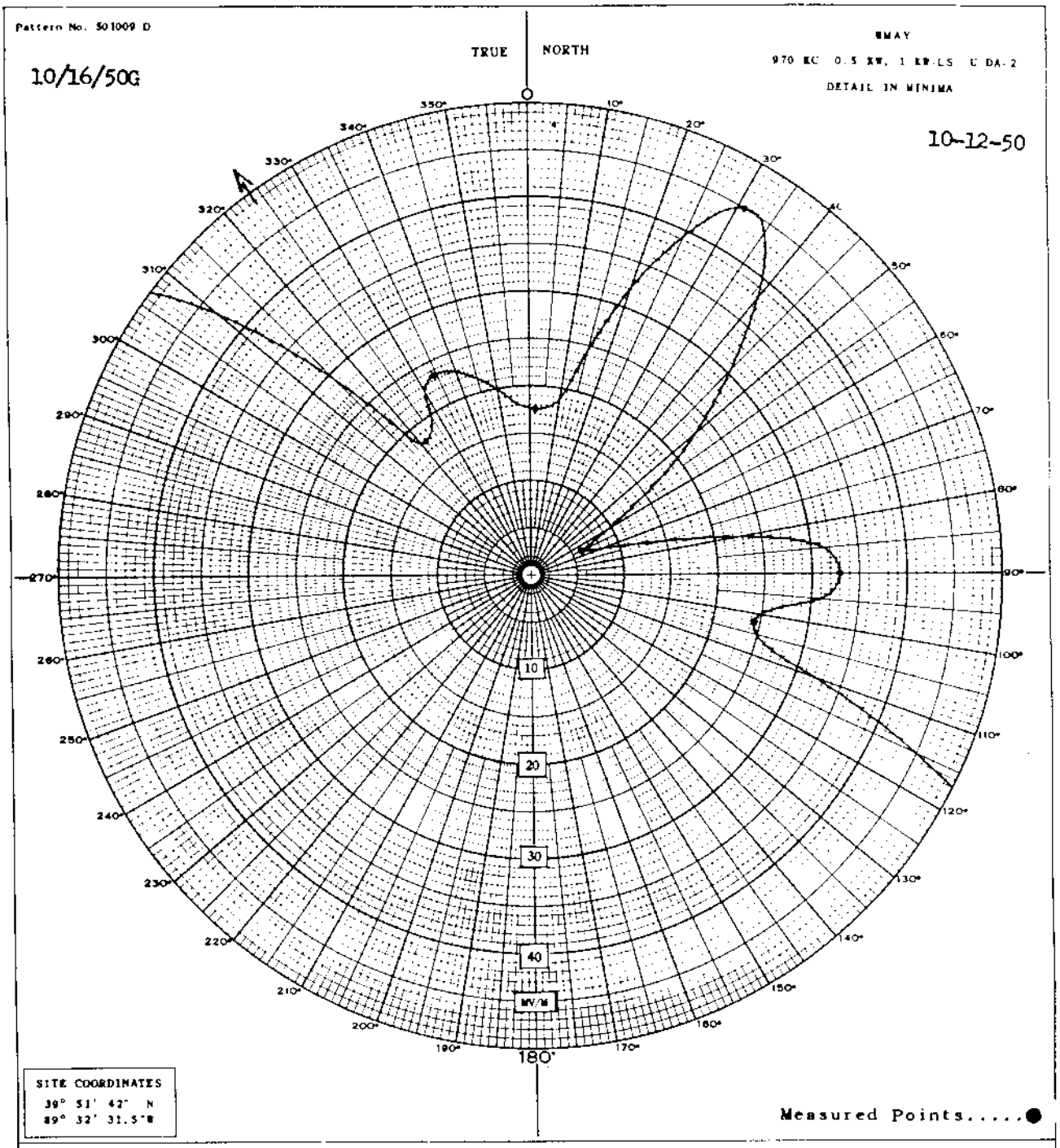
WMAY

SPRINGFIELD ILLINOIS

970 KC 0.5 KW, 1 KW-LS U DA-2

WMAY

MEASURED DAY NULLS **WMAY, SPRINGFIELD, ILL.** **500w, 1kw-LS, DA-2** **970 kc**



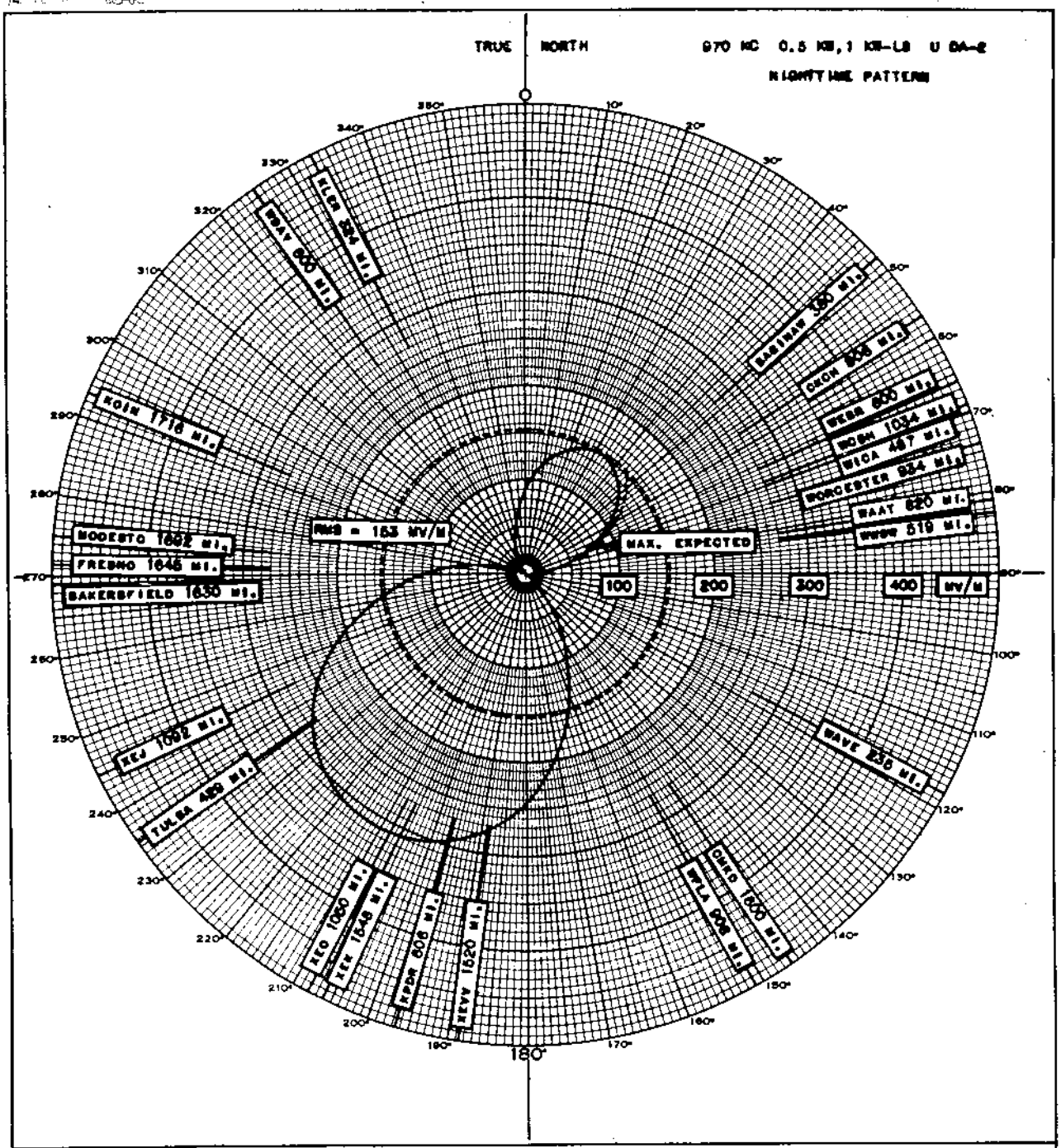
MEASURED DAYTIME HORIZONTAL PLANE RADIATION PATTERN

DETAIL IN MINIMA	LINCOLN BROADCASTING COMPANY	**Figure 15**
	WELDON & CARR *Consulting Radio Engineers*	WMAY
	Dallas • Washington • Seattle	SPRINGFIELD ILLINOIS
		970 KC 0.5 KW, 1 KW-LS U DA-2

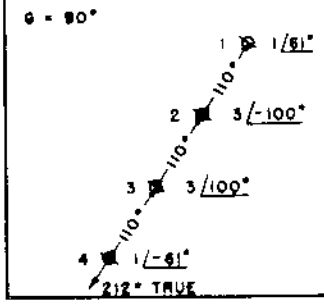
WMAY
SPRINGFIELD, ILL.

FIGURE 8.6A 970

APR 9 1948 G



CALCULATED HORIZONTAL PLANE RADIATION PATTERN FOR NIGHTTIME OPERATION



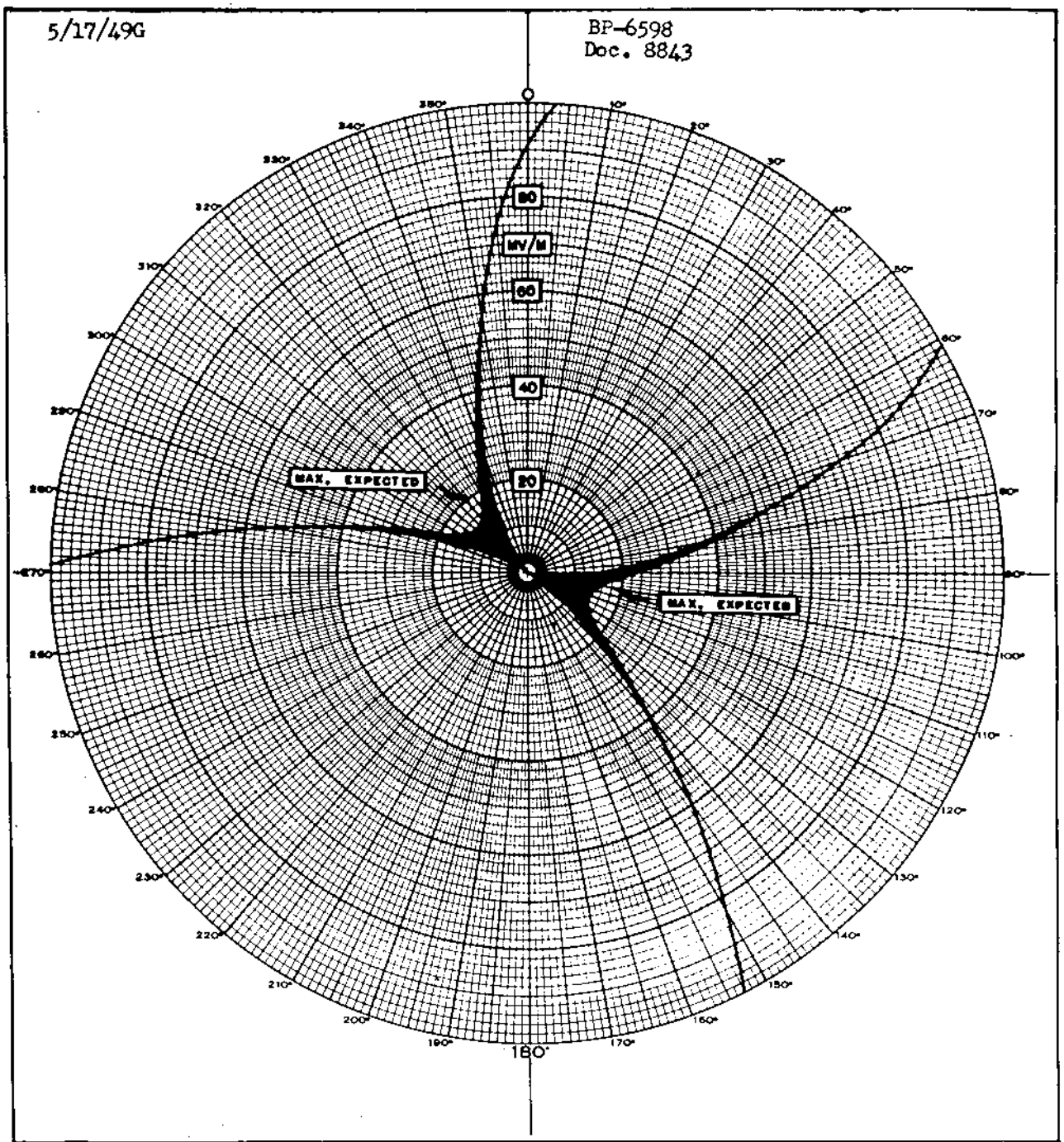
	LINCOLN BROADCASTING COMPANY SPRINGFIELD ILLINOIS	PROPOSED NEW STATION SPRINGFIELD ILLINOIS
	WELDON & CARR CONSULTING RADIO ENGINEERS WASHINGTON DC	970 KC 0.5 KW, 1 KW-LS U DA-2 4803040 SUPERSEDES 4706138

Rec'd 3-26-48 Amendment to BP-6598

WMAY
SPRINGFIELD, IL

PROPOSED NIGHT NULLS | NEW, SPRINGFIELD, ILL. (LINCOLN BG. CO.) | 3/29/48 | 500w,1kw-LS,DA2 | 970 kc

FIGURE 8.1A

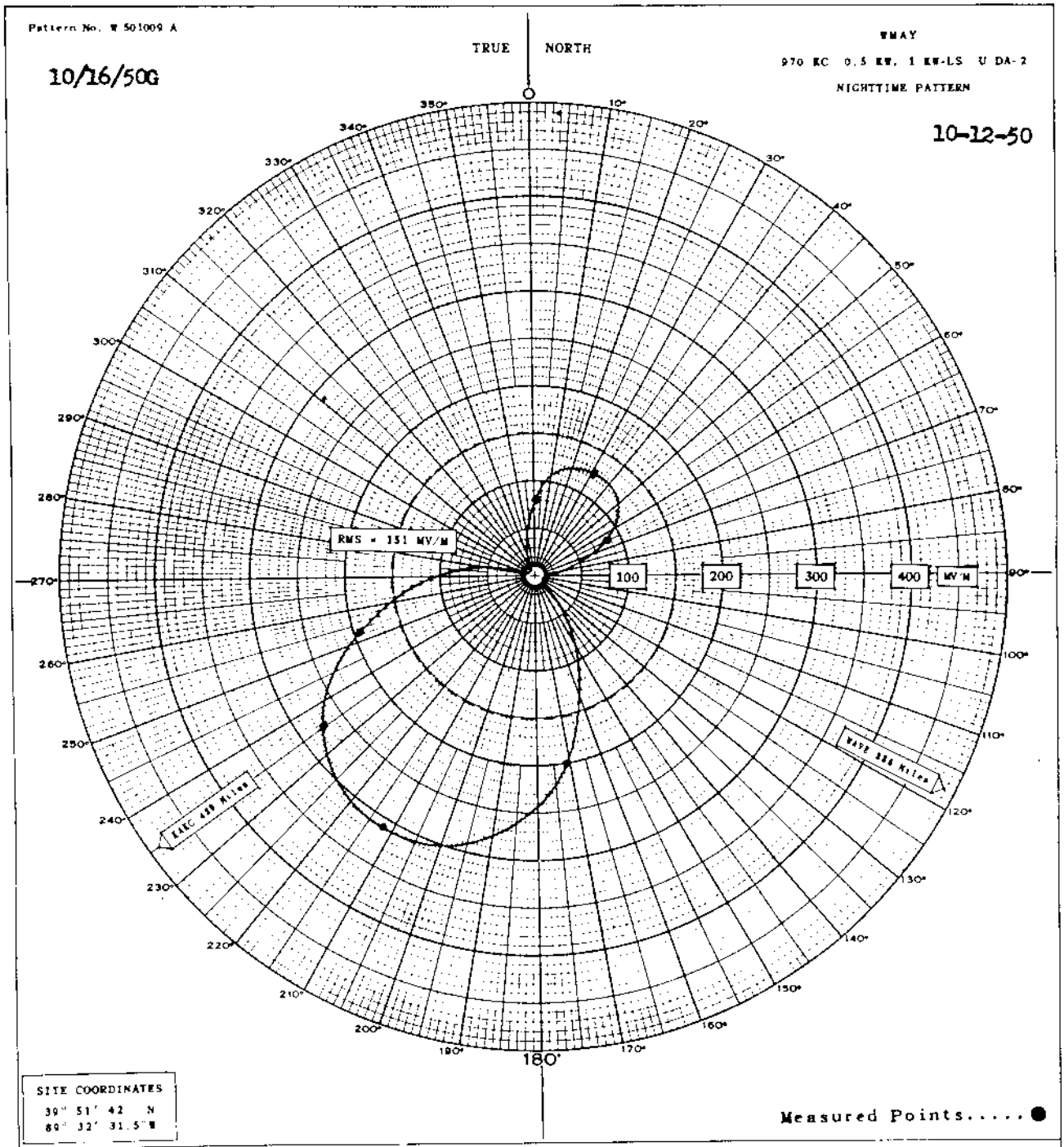


CALCULATED HORIZONTAL PLANE RADIATION PATTERN FOR NIGHTTIME OPERATION

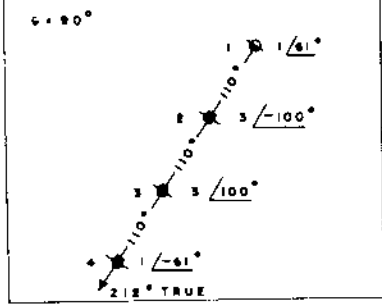
SITE: 39° 52' 51" N 89° 31' 27" W DETAIL IN NULLS	LINCOLN BROADCASTING COMPANY SPRINGFIELD ILLINOIS	PROPOSED NEW STATION SPRINGFIELD ILLINOIS
	WELDON & CARR CONSULTING RADIO ENGINEERS WASHINGTON DC	970 KC 0.5 KW,1 KW-LS U DA-2 480304E SUPERSEDES 470613C

WMAY

MEASURED **WMAY, SPRINGFIELD, ILL.** **500w, 1kw-LS, DA-2** **970 kc**
NIGHT



MEASURED NIGHTTIME HORIZONTAL PLANE RADIATION PATTERN



LINCOLN BROADCASTING COMPANY

WELDON & CARR *Consulting Radio Engineers*

Dallas • Washington • Seattle

Figure 10

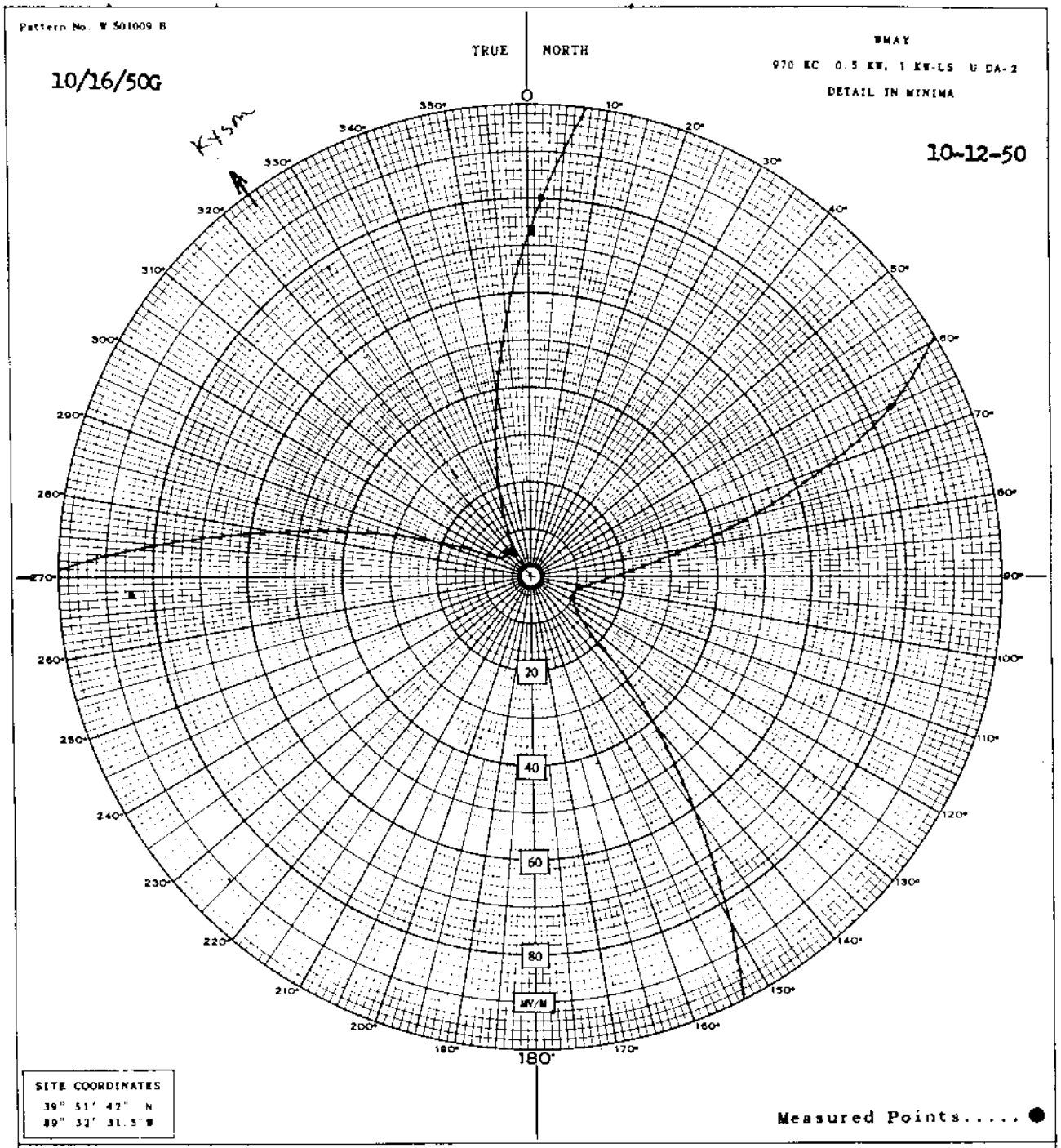
WMAY

SPRINGFIELD ILLINOIS

970 KC 0.5 KW, 1 KW-LS U DA-2

WMAY

MEASURED NIGHT NULLS — WMAY, SPRINGFIELD, ILL. — 500w, 1kw-LS, DA-2 — 970 kc



MEASURED NIGHTTIME HORIZONTAL PLANE RADIATION PATTERN

DETAIL IN MINIMA	LINCOLN BROADCASTING COMPANY	**Figure 11**
	WELDON & CARR *Consulting Radio Engineers*	WMAY
	Dallas • Washington • Seattle	SPRINGFIELD ILLINOIS
		970 KC 0.5 KW, 1 KW-LS U DA-2

WNIA

PROPOSED NIGHT (10-29-56g)

Station W A A T
Newark, New Jersey

1 KW-N, 5KW-D, DA-N, U

970 K C

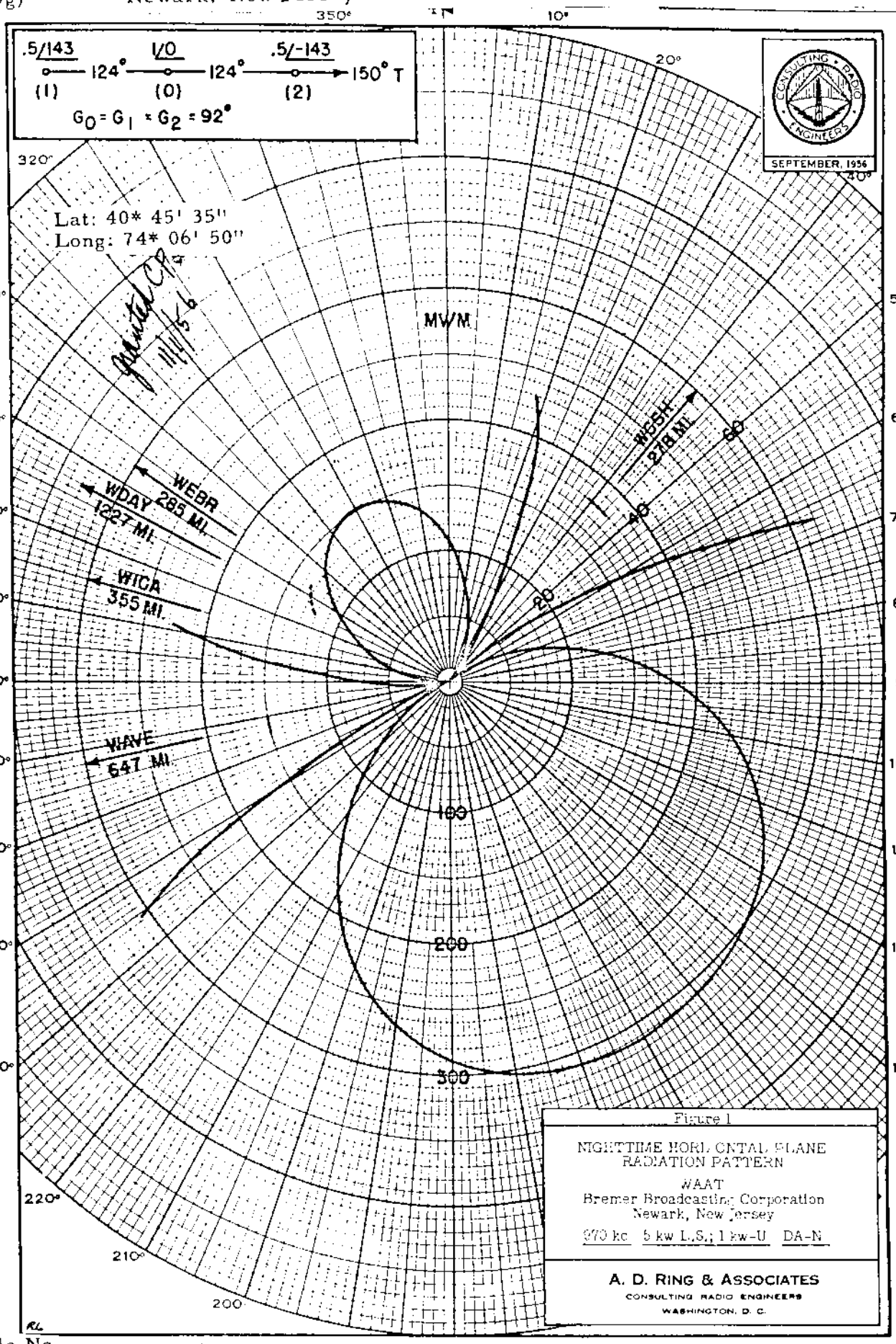


Figure 1

NIGHTTIME HORIZONTAL PLANE RADIATION PATTERN

WAAT
Bremer Broadcasting Corporation
Newark, New Jersey

970 kc 5 kw L.S.; 1 kw-U DA-N

A. D. RING & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

A. D. RING & ASSOCIATES - 11/56 - M

FCC File No.
BP-10,844

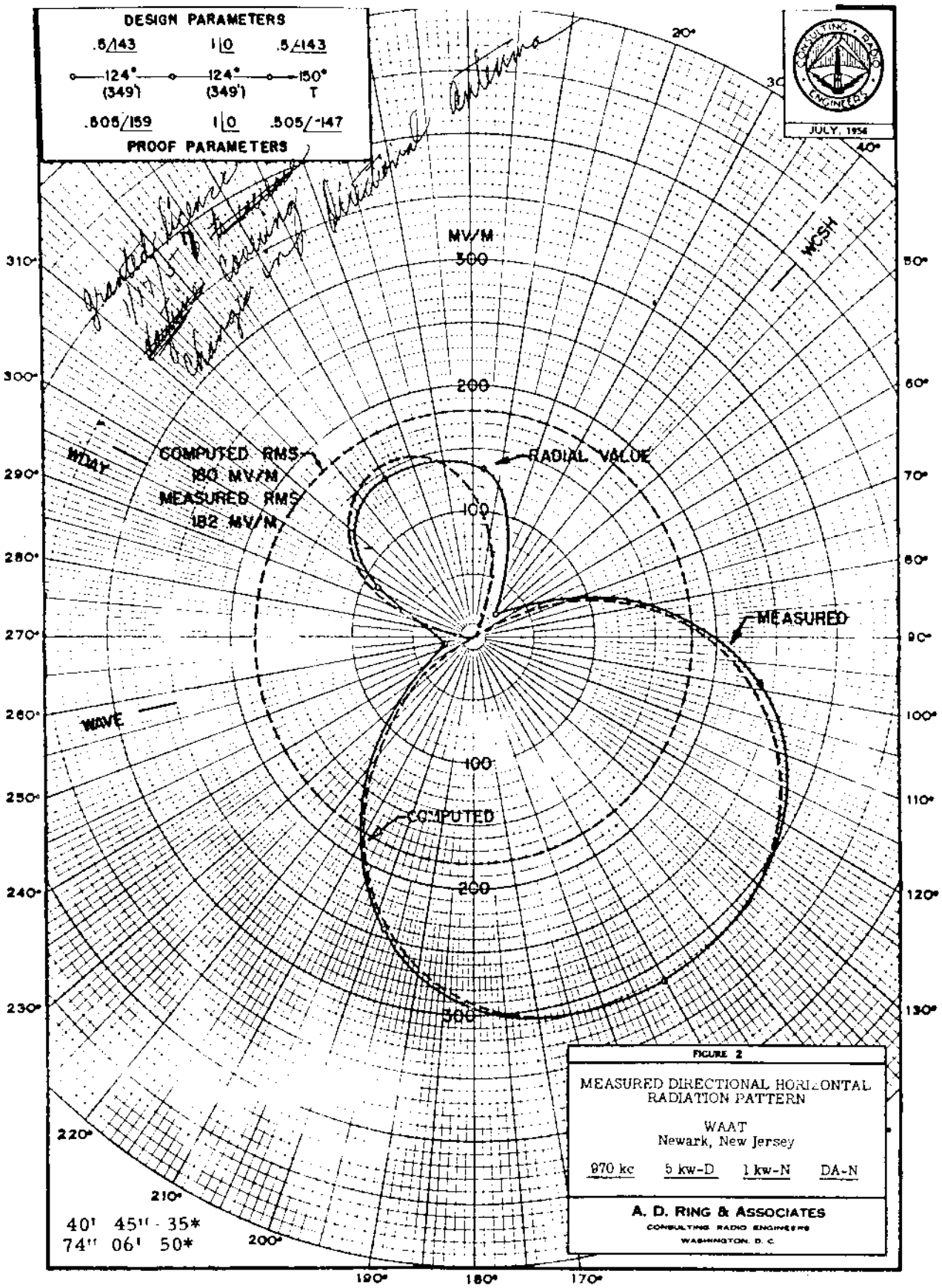
Accepted 10-22-56

Station W A A T
Newark, New Jersey

970 K C

WVNIA
~~WAAT~~

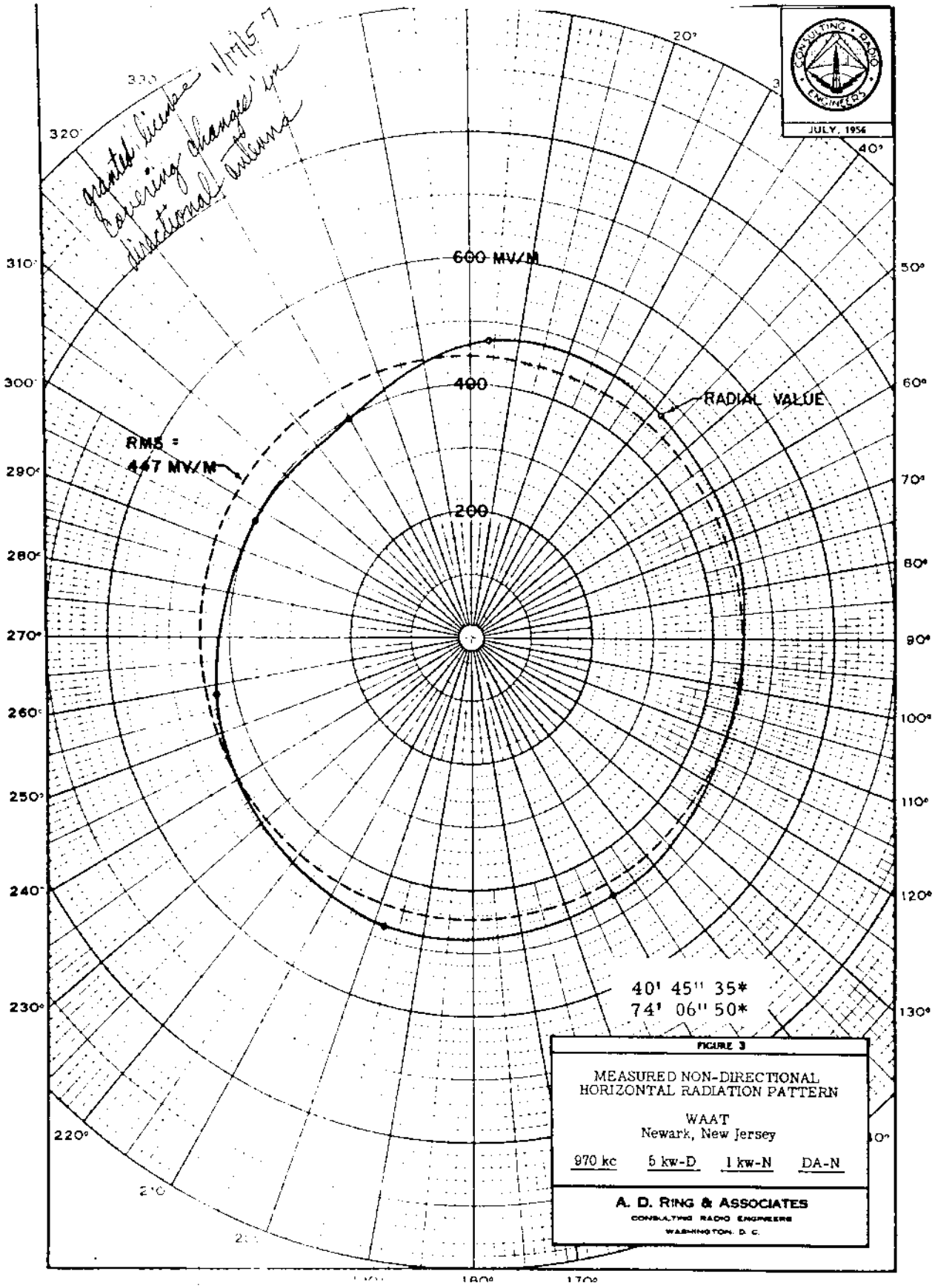
MEASURED NIGHT Station W A A T 5KW-D, 1KW-N,
(12-3-56g) Newark, New Jersey DA-N, U 970 KC



FCC File No. Accepted 11-14-56 WAAT
BL-6397 Newark, New Jersey 970 KC

~~WAAT~~ WNTA

MEASURED NON-DA (12-3-56)8 Station W A A T Newark, New Jersey 5 KW-D, 1KW-N, DA-N, U 970 KC



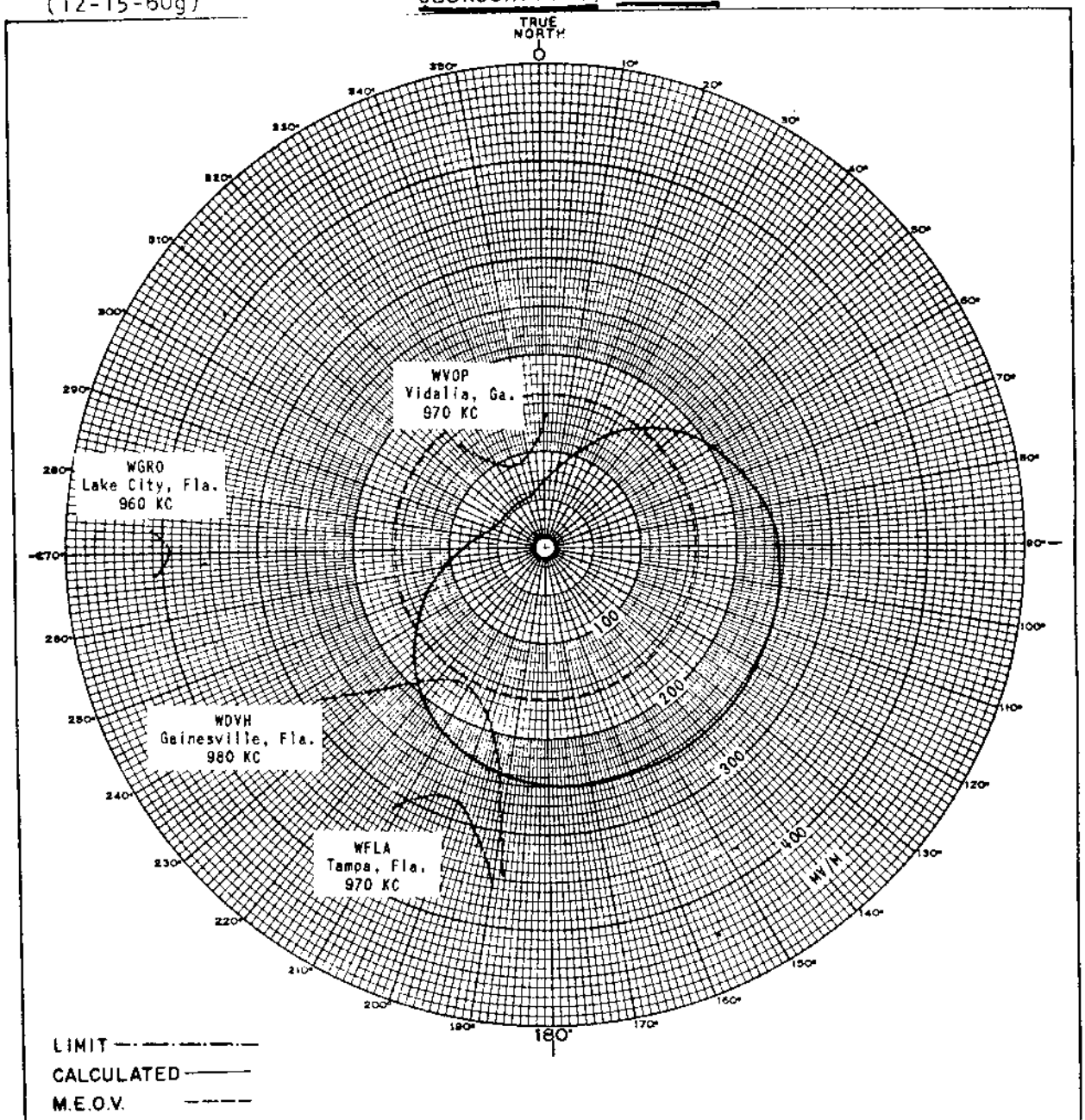
FCC File No. BL-6397 Accepted 11-14-56 Station WAAT Newark, N. J. 970 KC

WOZN

PROPOSED DAY
(12-15-60g)

New; B.F.J. Timm
Jacksonville, Florida

1kw, DA-D,D
970 KC



N320°E TRUE

#1 1.0/ 90°

264 FT

0.65/ 0° #2

G = 68° = 190 FT

FIELD INTENSITY VERSUS AZIMUTH		
ELEVATION ANGLE	0°	B. F. J. TIMM
RMS	179 MV/M	JACKSONVILLE, FLORIDA
N. LATITUDE	30° 23' 05"	970 KC - 1 KW - DAYTIME - (DA-D)
W. LONGITUDE	81° 40' 05"	PROPOSED
SUPERSEDES	591022	HORIZONTAL RADIATION
PATTERN NO.	601007	PATTERN
RUSSELL P. MAY CONSULTING RADIO ENGINEER WASHINGTON 5, D.C.		FIGURE NO. 2A

FCC File No. BP-13649
Accepted 11-14-60 (Amended)

B.F.J. Timm
Jacksonville, Florida 970 KC

WOZN

SUPPLEMENTAL DIRECTIONAL
ANTENNA DESCRIPTION SHEET

Station: WOZN

Main Studio: Jacksonville, Florida

Frequency: 970 kHz

Power: 1 kW

Notification List No. 1601

Date: October 9, 1974 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude:	30°	23'	08"
West Longitude:	81°	40'	04"

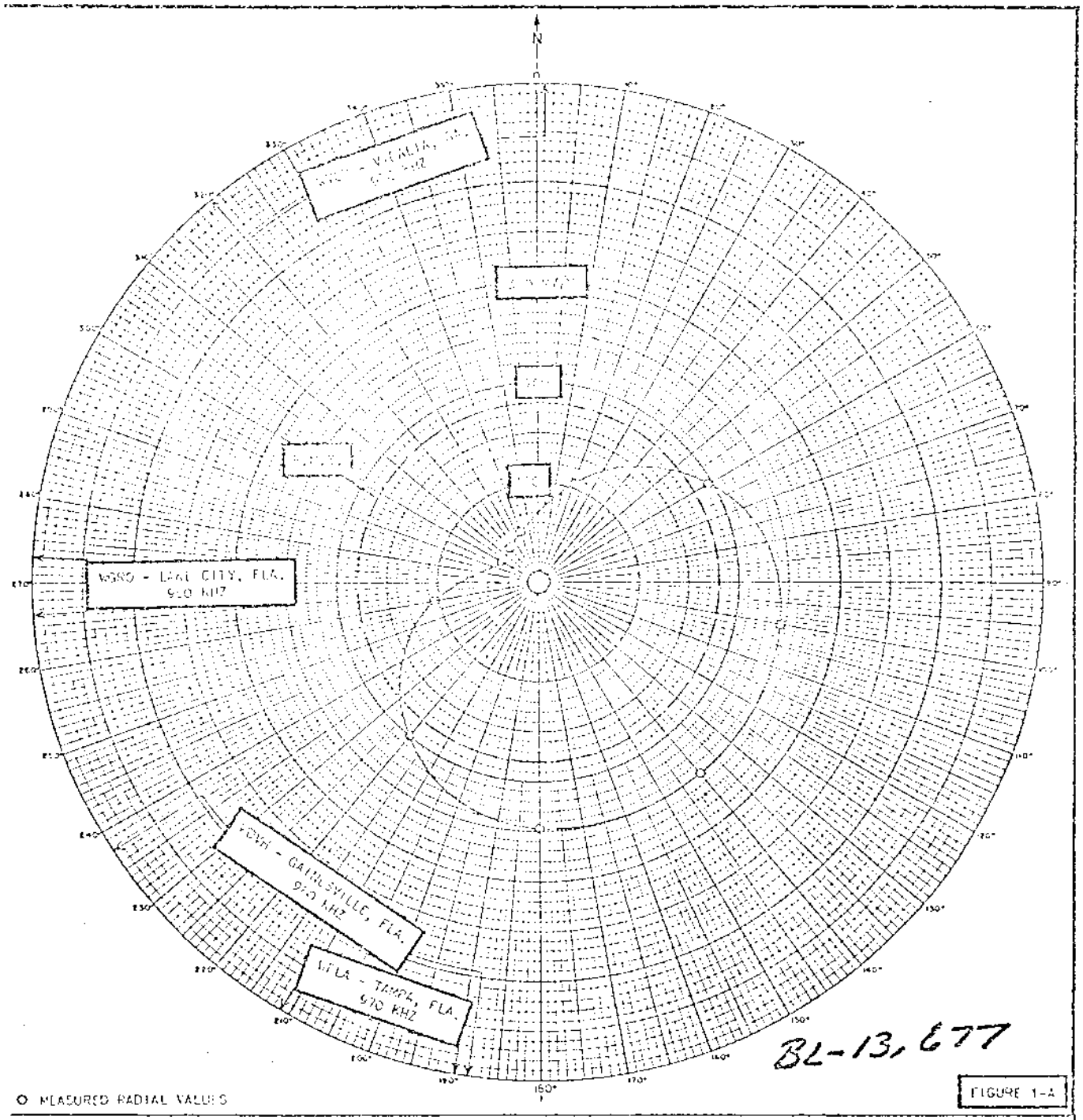
Authorized for Daytime operation (DA-D).

Tower height above insulators: 186' (66°) both towers.

Predicted effective Day Field: (omnidirectional) 179 mv/m at rated power.

Note: Please retain the description sheet and directional antenna radiation patterns notified for a new station at Jacksonville, Florida in United States Change List Number 1123, dated August 4, 1965 and attach to this supplemental Description Sheet. This notification is for the purpose of indicating only a correction in the geographical coordinates of the center of the antenna system and in the height of the towers.

WOZN

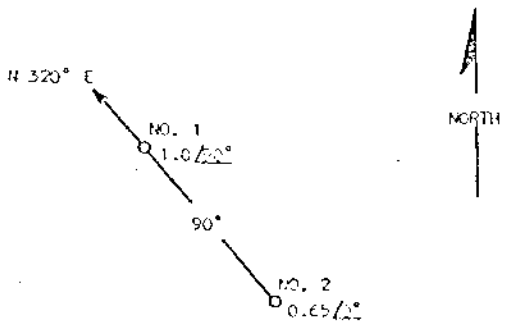


O MEASURED RADIAL VALUES

FIGURE 1-A

HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION



G = 66° (BOTH TOWERS)

APPLICANT	RADIO STATION WOZN
LOCATION	JACKSONVILLE, FLORIDA
FREQUENCY	970 KC/S
POWER	1 KW-D(DA)
LATITUDE	30 DEG 23 MIN. 08 SEC.
LONGITUDE	81 DEG 40 MIN. 04 SEC.
WHEN USED	DAYTIME HOURS
RMS FIELD	179 MV/M (MEASURED)
DATE	MARCH 1974

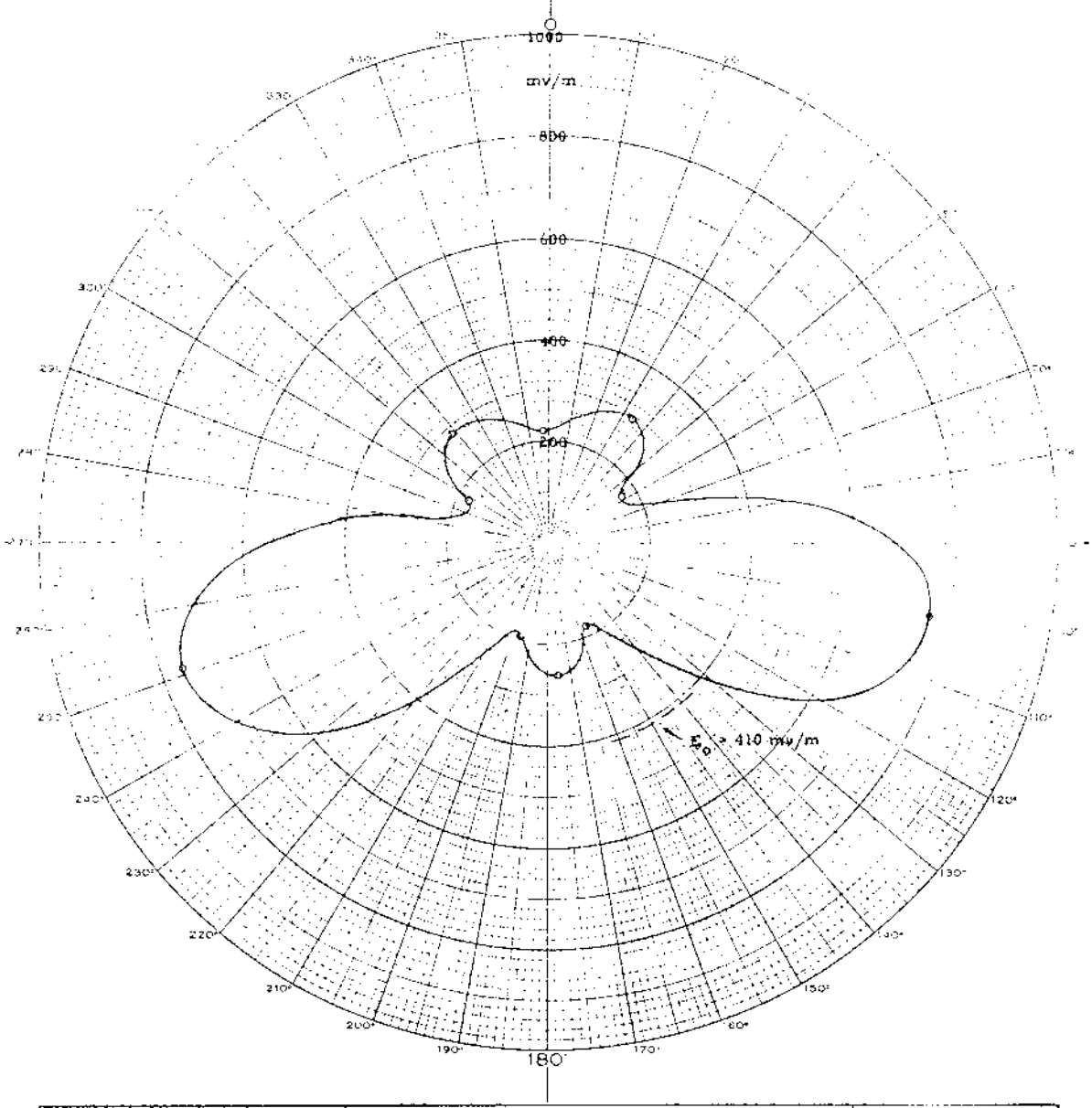
SILLIMAN, MOFFET & KOWALSKI

CONSULTING RADIO ENGINEERS

WASHINGTON, D.C.

Measured Dly
(3-22-/?ct)

Station WREO
Ashtabula, Ohio



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA
	TOWER	ELECTRICAL HEIGHT	TRUE TOWER ORIENTATION	SPACING	PHASING	HORIZONTAL FIELD	FIELD RATIO	ELEV ANGLE	ELEVATION RMS FIELD	CALL WREO
										FREQUENCY 970 kc
										POWER 1N/5D LS kw
No. 1 1 /0°	1	125	0	0.0	0.0		1.00	0	410	TYPE OF OPERATION U
S = 87.5°	2	90	176	87.5	-142.5		0.80	10		TYPE OF OPERATION DA-2
No. 2 0.8 /-142.5°	3	90	176	175.0	20.0		0.80	20		DAY NO. TOWERS 1, 2, 3, 4
S = 87.5°	4	90	176	262.5	-122.5		0.64	30		NIGHT NO. TOWERS 1, 2, 3, 4
No. 3 0.8 /20°								40		180
S = 87.5°										142 400
No. 4 0.64/-122.5°										48 ft sq
176°								70		41 48 52
										80 46 45
										490222
										710120

FIG. 6.16

DA-D MEASURED HORIZONTAL PATTERN

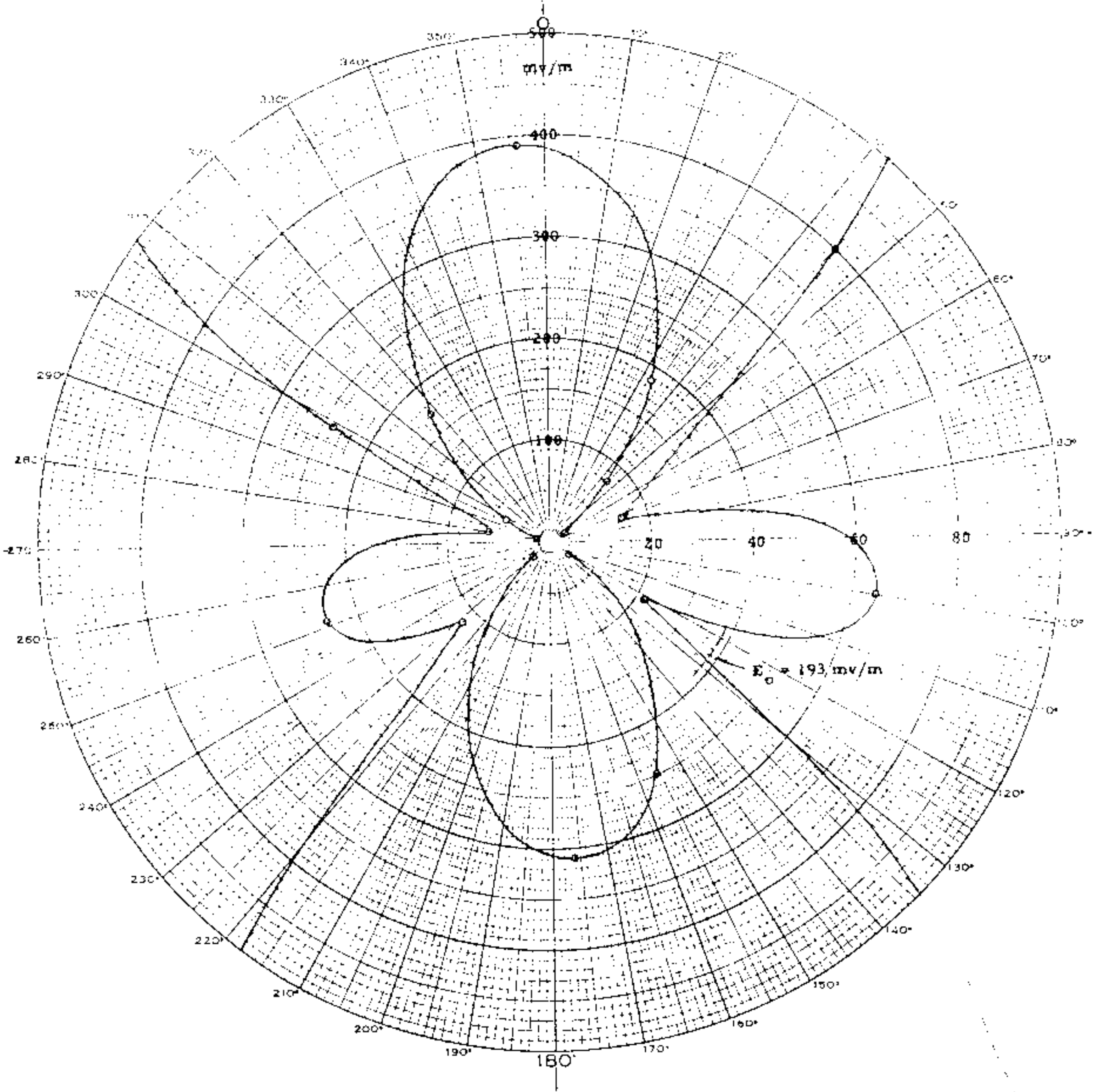
Carl E. Smith
Consulting Radio Engineers

Radio Station WREO
Ashtabula, Ohio

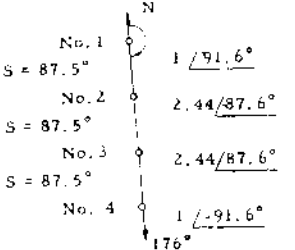
Measured Night
(3-22-71 ct)

Station WREO
Ashtabula, Ohio

WREO
1kw, 5kw-LS, DA-2, U
970 kc



TOWER PLACEMENT SKETCH



PATTERN PARAMETERS

TOWER No.	ELECTRICAL HEIGHT	TRUE TOWER ORIENTATION	SPACING	PHASING	HORIZONTAL FIELD	FIELD RATIO	ELEV ANGLE	ELEVATION RMS FIELD
1	125	0	0.0	91.6		1.00	0	193
2	90	176	87.5	-87.6		2.44	10	
3	90	176	175.0	87.6		2.44	20	
4	90	176	262.5	-91.6		1.00	30	
							40	
							50	

STATION DATA

CALL WREO
FREQUENCY 970 kc
POWER 1N/5D LS kw
TIME OF OPERATION U
TYPE OF OPERATION DA-2
DAYTIME TOWERS 1, 2, 3, 4
NIGHTTIME TOWERS 1, 2, 3, 4
180
142 - 400
48 ft sq
41 48 52
80 46 45
540713
710121

FIG. 6.17

DA-N MEASURED HORIZONTAL PATTERN

Carl E. Smith
Consulting Radio Engineers

Radio Station WREO
Ashtabula, Ohio

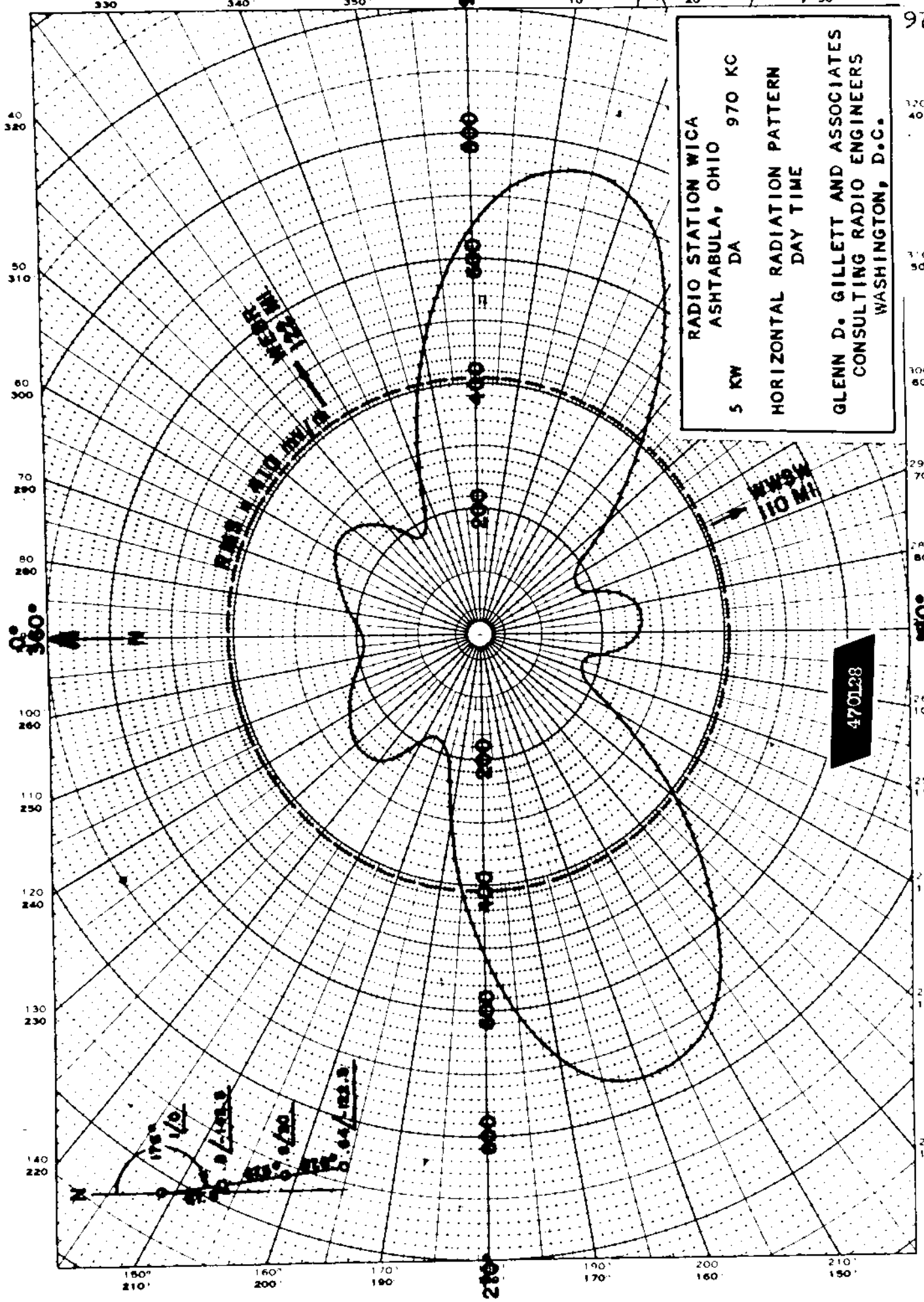
FCC File No. BZ-7756
Accepted 2-22-71

Station WREO
Ashtabula, Ohio

970 kc

MK 2497 WREO

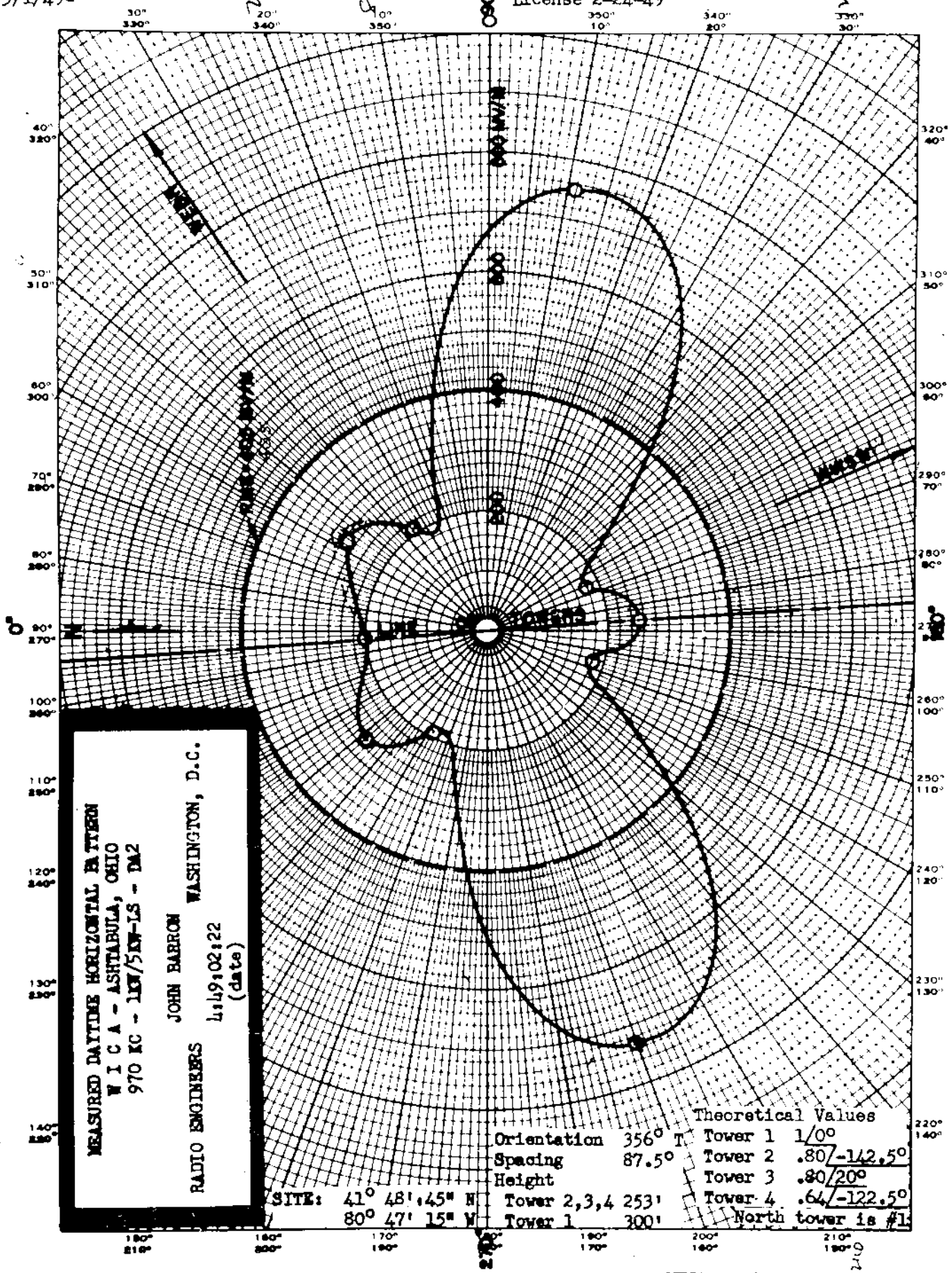
970



WREO

MEASURED WICA, ASHTABULA, OHIO 1kw,5kw-LS,DA2 970 kc

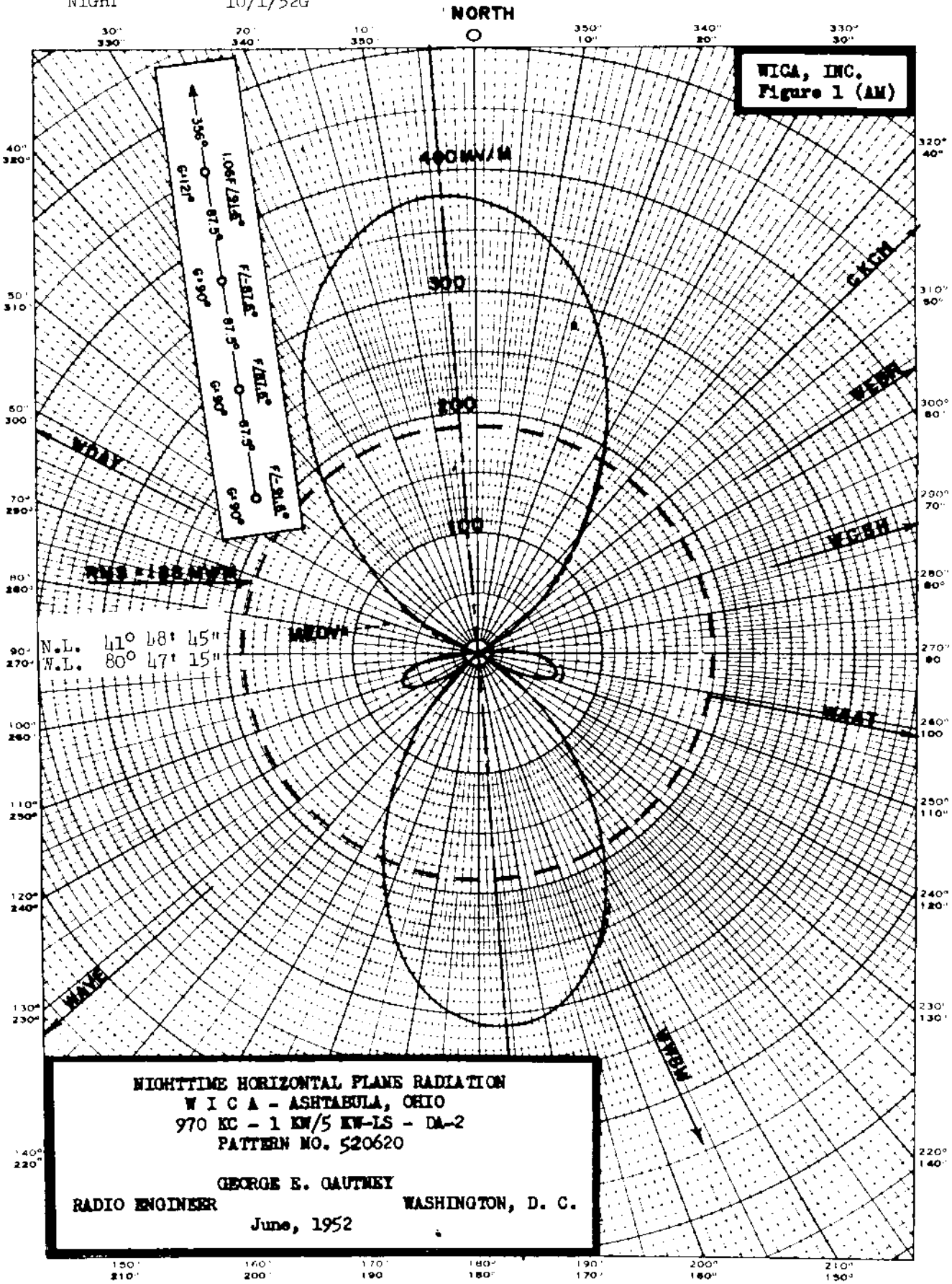
DAY 3/1/49G License 2-24-49



WICA, ASHTABULA, OHIO 970 kc

WREO

PROPOSED WICA, ASHTABULA, OHIO 1 KW, 5KW-LS, U, DA-2 970 KC
NIGHT 10/1/52G



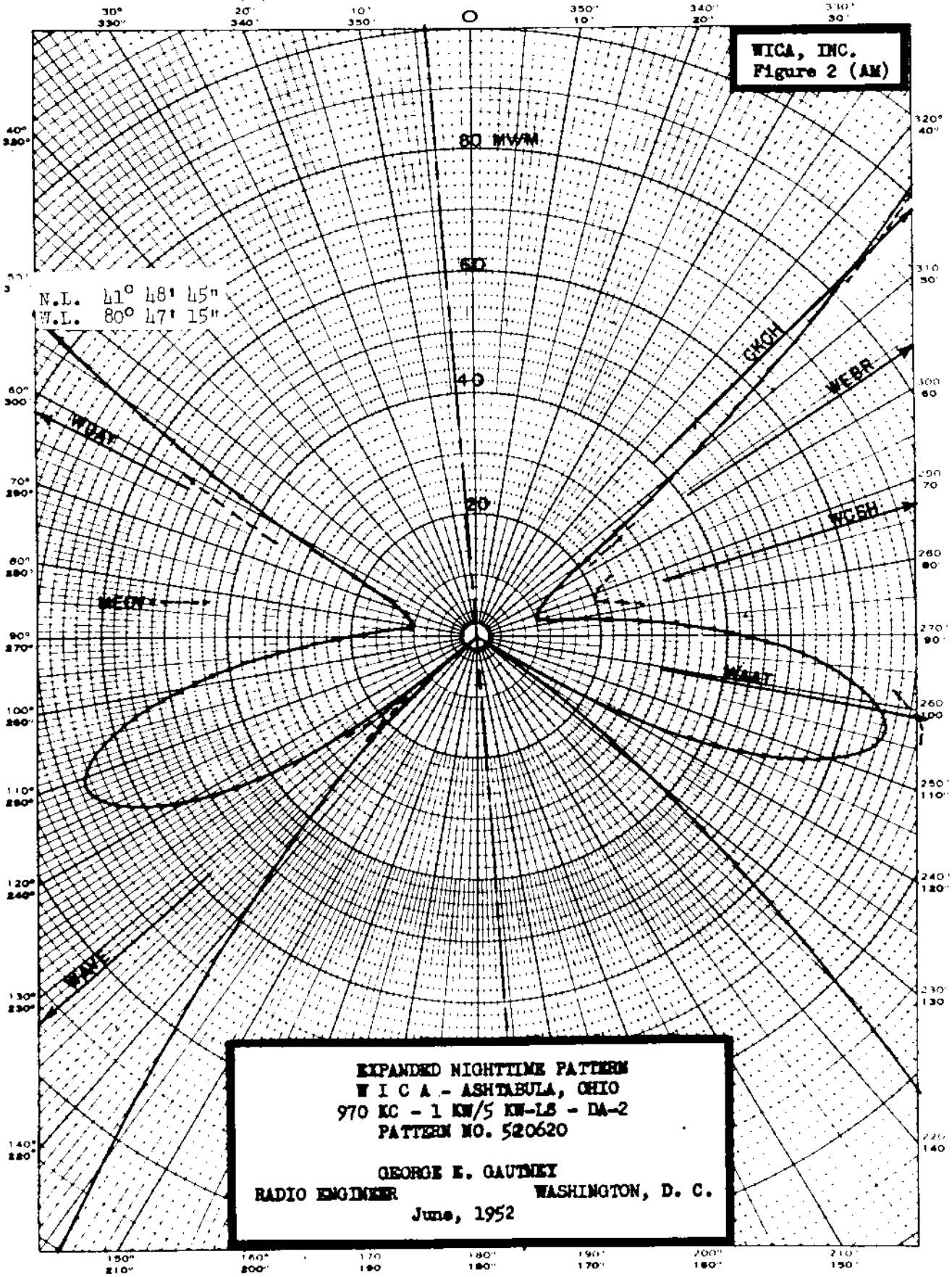
NIGHTTIME HORIZONTAL PLANE RADIATION
W I C A - ASHTABULA, OHIO
970 KC - 1 KW/5 KW-LS - DA-2
PATTERN NO. 520620

GEORGE E. CAUTNEY
RADIO ENGINEER WASHINGTON, D. C.
June, 1952

APPL RECD FCC 9/10/52 ACC 9/24/52 BP-8607 WICA, ASHTABULA, OHIO 970 KC

WREO

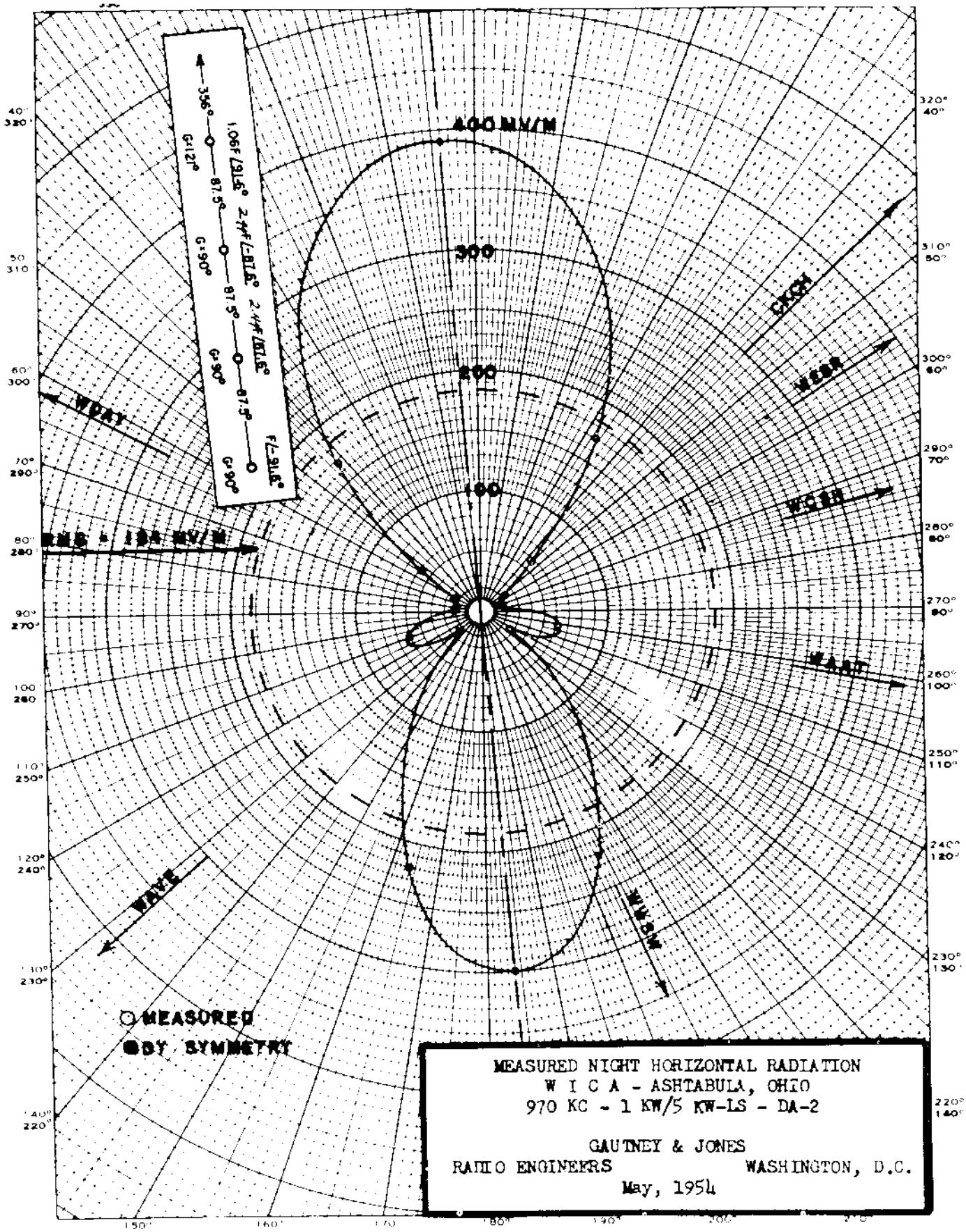
PROPOSED WICA, ASHTABULA, OHIO 1 KW, 5KW-LS, U, DA-2 970 KC
NIGHT NULLS 10/1/52G



APPL RECD FCC 9/10/52 ACC 9/24/52 BP-8607 WICA, ASHTABULA, OHIO 970 KC

WREO

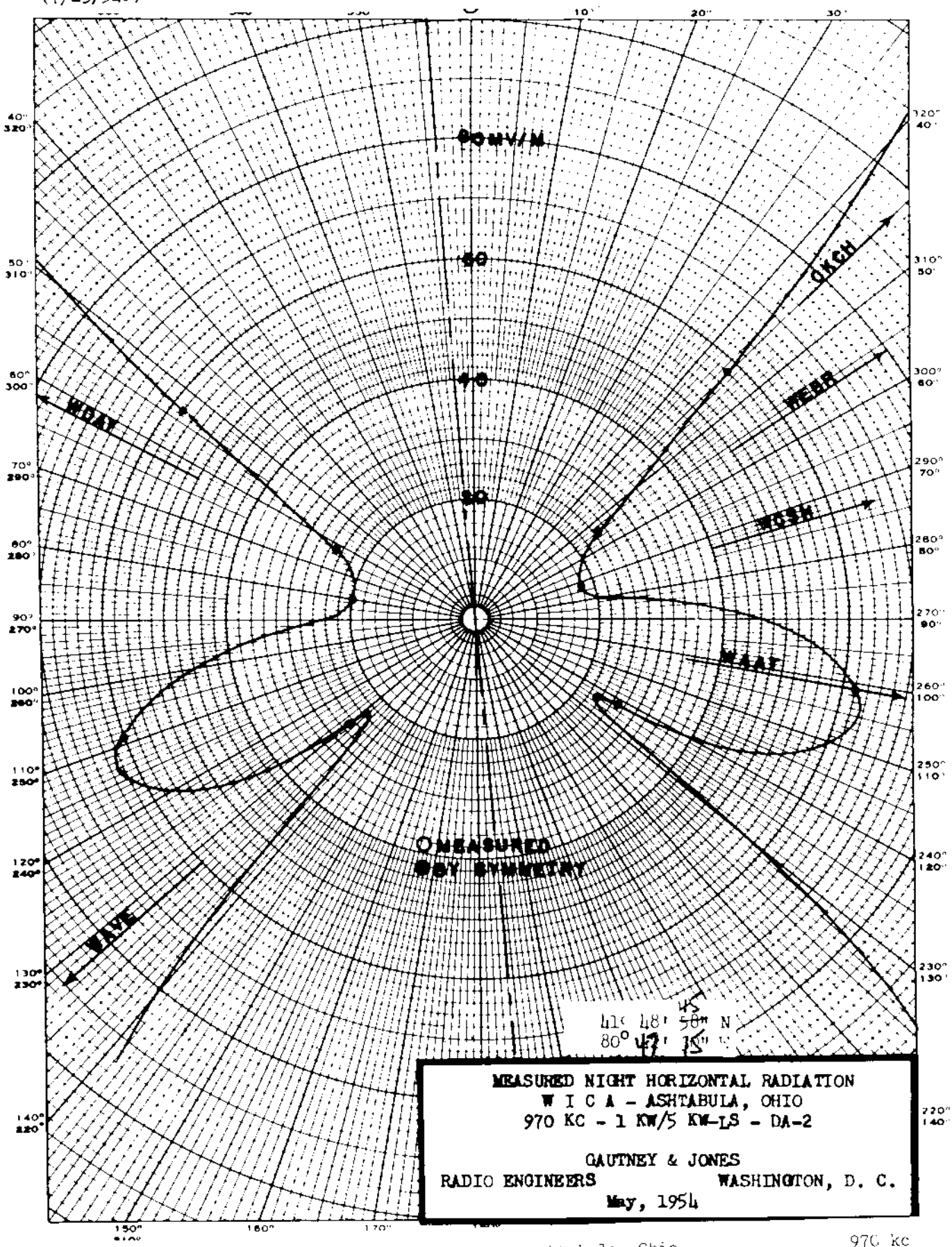
MEASURED WICA, Ashtabula, Ohio 1KW,5KW-LS, U, DA-2 970 kc
NIGHT (7/13/54G)



FCC File No. BL-5229 Amended Accepted 6/4/54 WICA, Ashtabula, Ohio 970 kc

WREO

MEASURED WICA, Ashtabula, Ohio 1KW, 5KW-LS, U, DA-2 970 kc
NIGHT (7/13/54)



970 kc

FCC File No. BL-5225 Amended Accepted 6/4/54 WICA, Ashtabula, Ohio

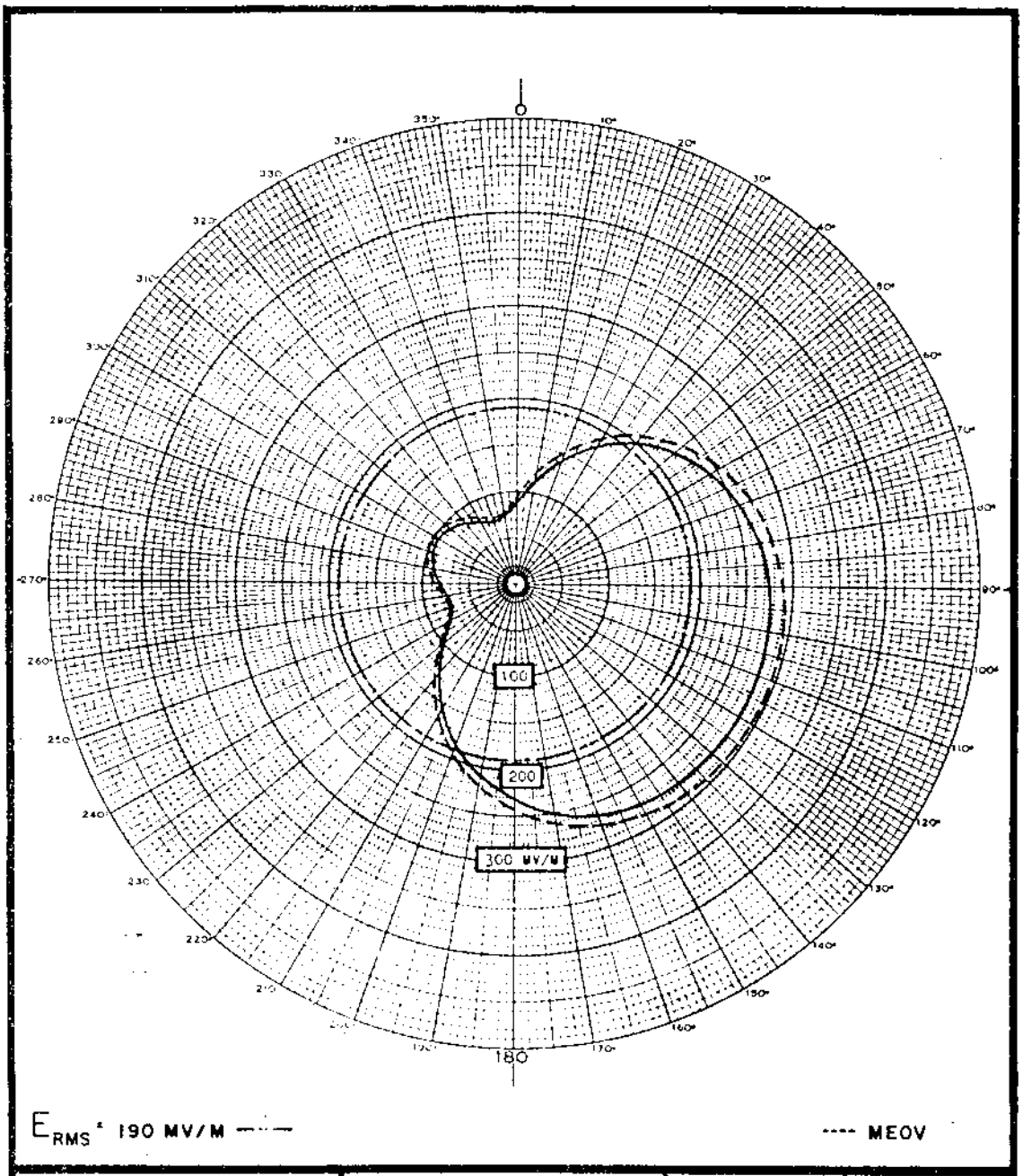
WRKN

Proposed Day
(4-28-66ct)

New; Wilbur J. Martin, Sr.
Brandon, Mississippi

1kw,DA-D,D
970 kc

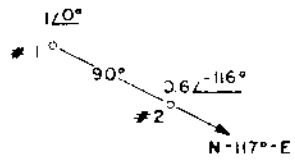
-P 10-14-66



LATITUDE 32° 17' 20"
LONGITUDE 89° 59' 50"

JOHN H. MULLANEY
AND
ASSOCIATES
A DIVISION OF MULTRONICS INC

ANTENNA PARAMETERS



G = 260' = 92.2° (ALL)

FIGURE 5

PROPOSED DAYTIME
DIRECTIONAL PATTERN

WILBUR J. MARTIN, SR.
BRANDON, MISSISSIPPI

970 KC 1KW,DA-D,D

FCC File No.BP-16821
Accepted 4-8-66 Amended

New; Wilbur J. Martin, Sr.
Brandon, Mississippi

970 kc

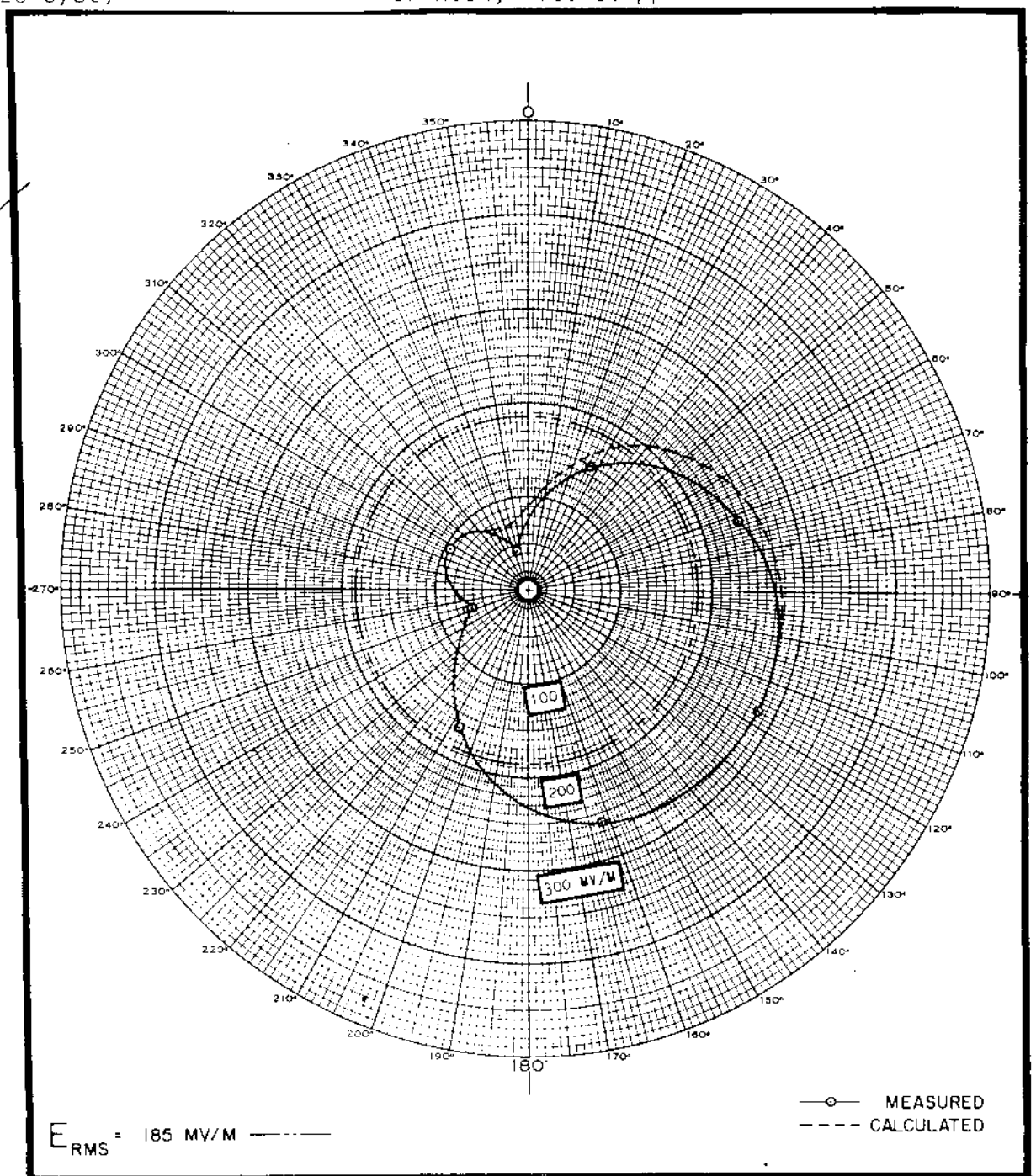
WRKN

Measured Day
(7-26-67ct)

Station WRKN
Brandon, Mississippi

1kw, DA-D, D
970 kc

7-10-67
GRANTED
LICENSE
NEW AM
STATION



LATITUDE 32° 17' 20"
LONGITUDE 89° 59' 50"

JOHN H. MULLANEY
AND
ASSOCIATES

ANTENNA PARAMETERS

	CALCULATED	MEASURED
#1	1/0°	1/0°
#2	0.6/-16°	0.545/-97°

#1 90° #2 N - 117° - E

G G_p 93.2°/260'

FIGURE 11
MEASURED DIRECTIONAL PATTERN

RADIO STATION WRKN
BRANDON, MISSISSIPPI

970 KHZ 1 KW, DA-D

FCC File No. BL-11693
Accepted 7-21-67

Station WRKN
Brandon, Mississippi

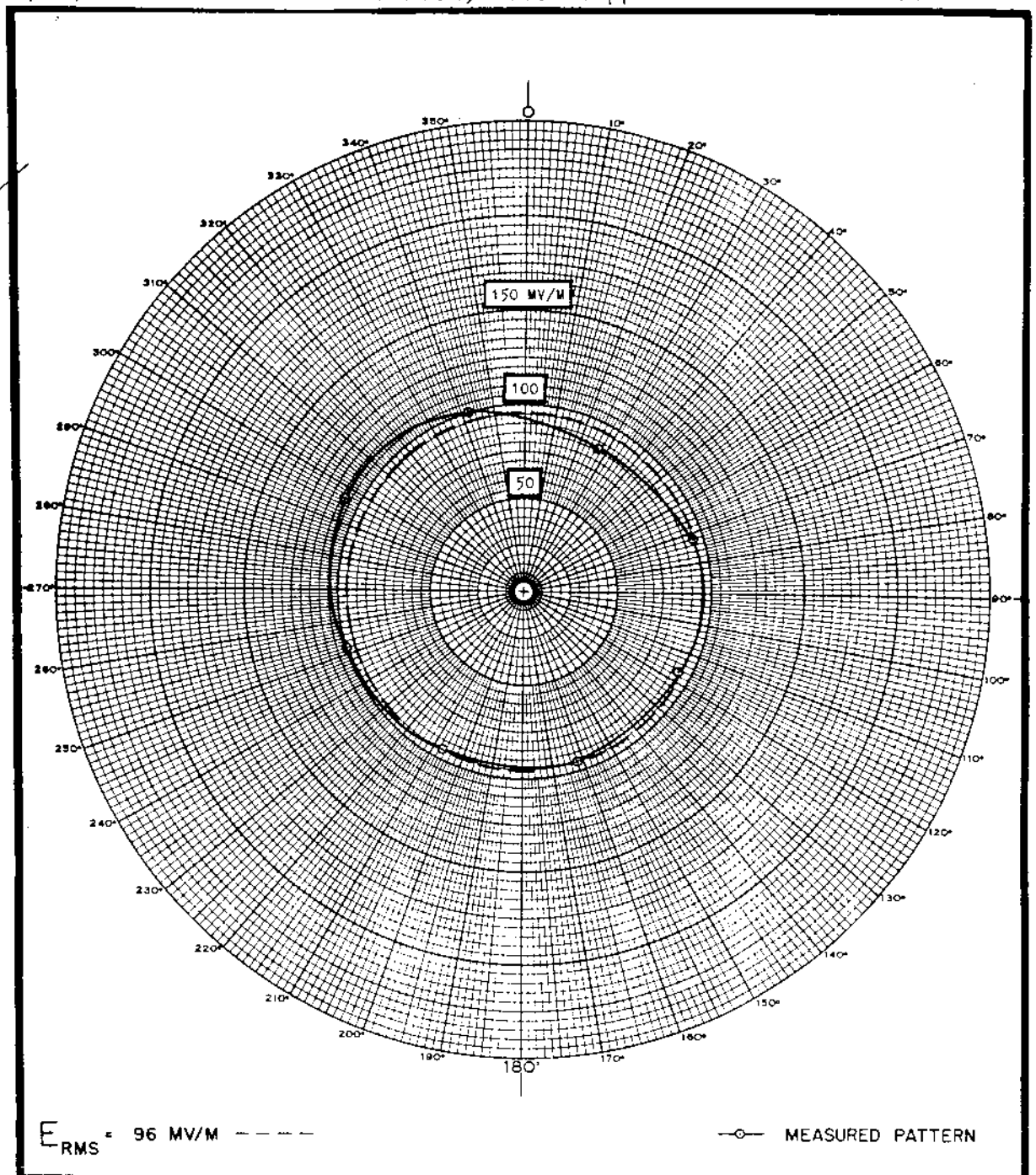
970 kc

Measured Non-DA
(7-26-67ct)

Station WRKN
Brandon, Mississippi

1kw,DA-D,D
970 kc

8-10-67
GRANTED
LICENSE
NEW AM
STATION



LATITUDE: 32° 17' 20" LONGITUDE: 89° 59' 50"	ANTENNA PARAMETERS	FIGURE 10 MEASURED NON-DIRECTIONAL PATTERN
JOHN H. MULLANEY AND ASSOCIATES	TOWER NO. 2 (E) 250 WATTS	RADIO STATION WRKN BRANDON, MISSISSIPPI 970 KHz 1 KW, DA-D

FCC File No.BL-11693
Accepted 7-21-67

Station WRKN
Brandon, Mississippi

970 kc

WTBF

PROPOSED NIGHT
(3/22/56)

STATION WTBF
TROY, ALABAMA

500W, 5KW-LS
DA-2, U

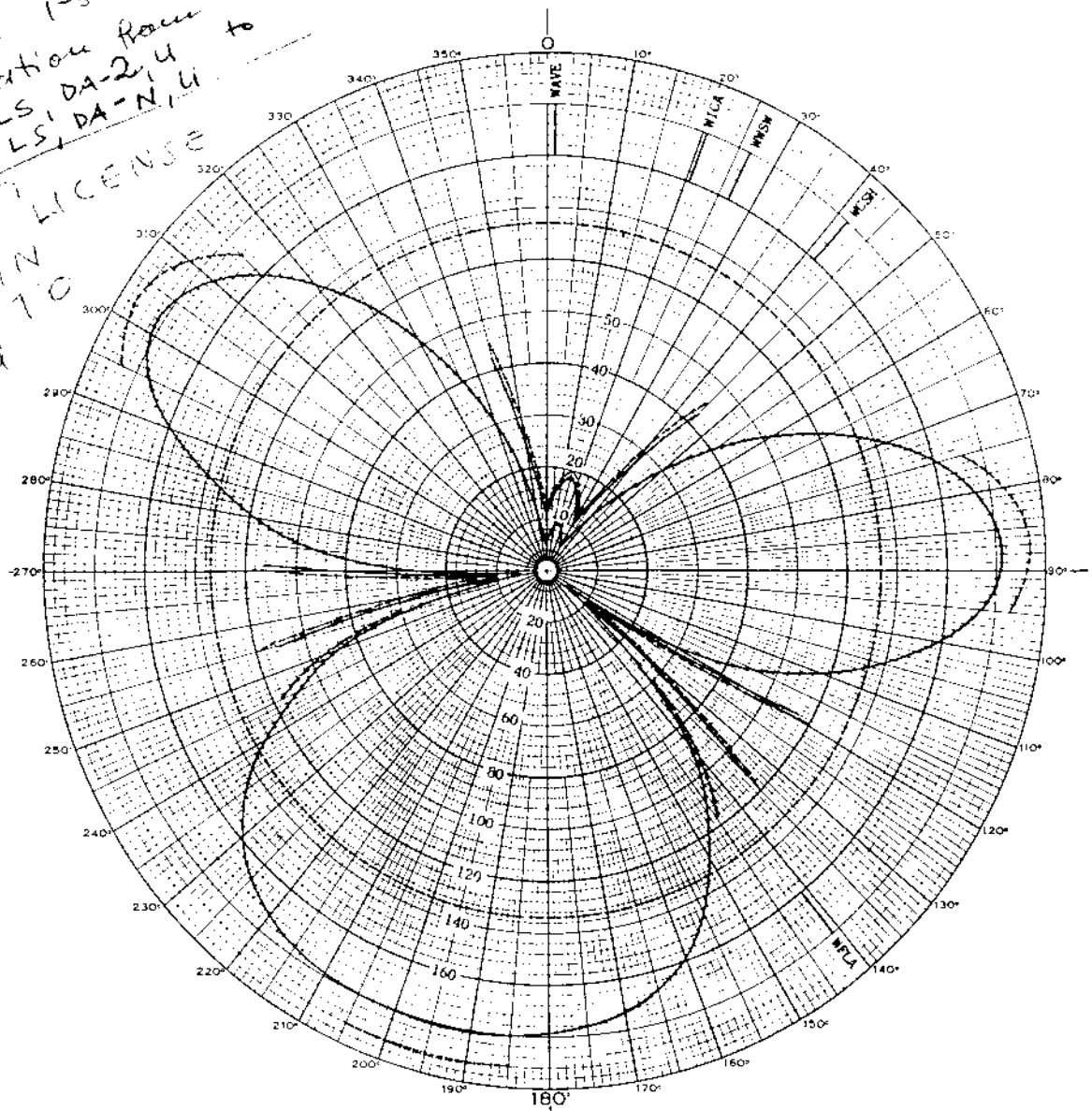
970 KC

POLAR COORDINATE

NO. TO HP

CLEVELAND INSTITUTE OF RADIO ELECTRONICS
CLEVELAND OHIO

BP-17468
PPL. accepted 1-3-67
change operation from
500W 5KW-LS, DA-2, U to
500W, 5KW-LS, DA-N, U
10-31-67
GRANTED LICENSE
CHANGES IN
DA-2, U TO
DA-N, U



------- NEW VALUES

TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA
N 15° E N 25° E #3 0.9 /-80° #2 270° #1 1/0	TOWER	ELECTRICAL HEIGHT	TRUE TOWER ORIENTATION	SPACING	PHASING	HORIZONTAL FIELD	FIELD RATIO	ELEV ANGLE	ELEVATION RMS FIELD	CALL WTBF
	KC									FREQUENCY 970 KC
										POWER 0.5 KW
	1	71	000	000	000		1	0		TIME OF OPERATION NIGHT
	2							10		TYPE OF OPERATION DA
	3	71	015	270	-80°		0.9	20		DAYTIME TOWERS 2-3
	4							30		NIGHTTIME TOWERS 1-3
	5							40		NO RADIALS PER TOWER 120
	6							50		LENGTH OF RADIALS 88.7' 250'
	7							60		GROUND SCREEN DIMENS DA 24' X 24'
	8							70		LAT 31° 50' 03.8"
	9							80		LONG 85° 56' 00.6"
	10						1			SUPERSEDES
	DAYTIME OPERATION ☐			NIGHTTIME OPERATION ☒						PATTERN No 550119B

CLAUDE M. GRAY
CONSULTING RADIO ENGINEER
BIRMINGHAM, ALA.

EXHIBIT
1-A-9

NIGHTTIME
PROPOSED HORIZONTAL RADIATION PATTERN
W T B F TROY, ALABAMA
0.5 KW, 5 KW LS. DA-2 970 KC

FILE BP-9696 Accepted 2/28/56 BCC WTBF, Troy, Alabama 970 KC

WTBF

granted license 4/3/57

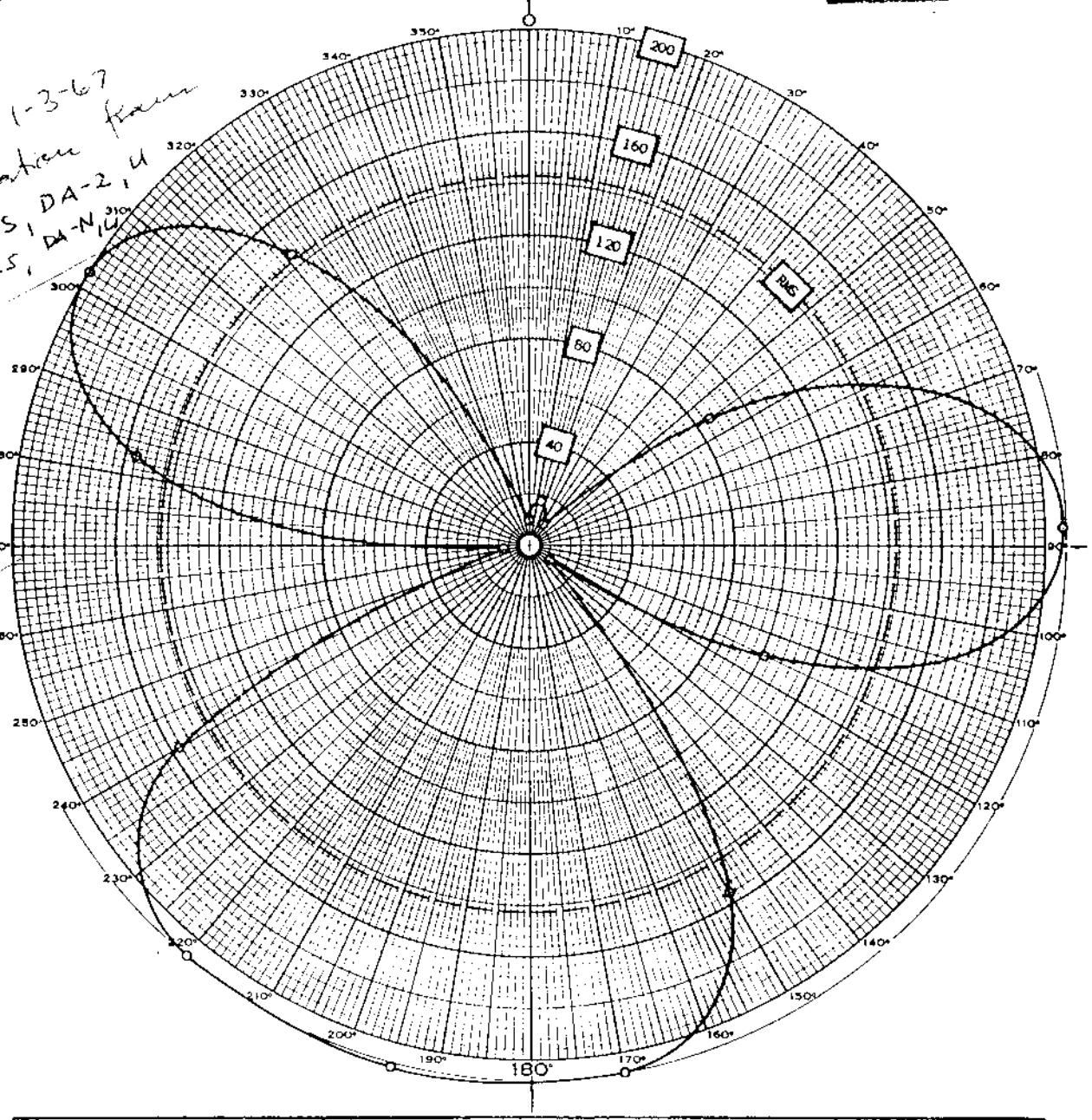
BP-17468 PPL accepted 1-3-67 to change operation from 500W, SKW-LS, DA-2, U to 500W, SKW-LS, DA-N, U

10-31-67 GRANTED LICENSE CHANGES FROM DA-2, U to DA-N, U

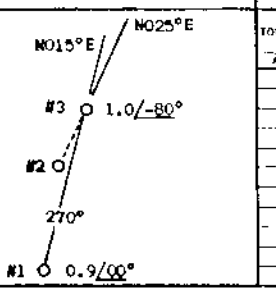
MEASURED NIGHT
(3/4/57g)

Station ~~WTBF~~
Troy, Alabama

500w,5kw-LS, DA-2,U
970 KC



TOWER PLACEMENT SKETCH



PATTERN PARAMETERS

TOWER No.	ELECTRICAL HEIGHT G°	TRUE TOWER ORIENTATION φ°	SPACING S°	PHASING ψ°	HORIZONTAL FIELD mv/m E	FIELD RATIO F	ELEV. ANGLE θ°	ELEVATION RMS FIELD mv/m E_θ
1	71°	000°	000°	000°		0.9	0	
2							10	
3	71°	015°	270°	-80°		1.0	20	
4							30	
5							40	
6							50	
7							60	
8							70	
9							80	
10							RMS 143 mv/m	

DAYTIME OPERATION ☐ NIGHTTIME OPERATION ☒ E_1 = mv

STATION DATA

CALL	WTBF
FREQUENCY	970 kc
POWER	0.5 kw
TIME OF OPERATION	Night
TYPE OF OPERATION	DA
DAYTIME TOWERS	2 & 3
NIGHTTIME TOWERS	1 & 3
No RADIALS PER TOWER	120
LENGTH OF RADIALS	141 - 250 ft
GROUND SCREEN DIMENSION	24 x 24'
LAT.	31° 50' 03.8"
LONG.	85° 56' 00.6"
SUPERSEDES	
PATTERN No.	561208A

CLAUDE M. GRAY
CONSULTING RADIO ENGINEER
BIRMINGHAM, ALA.

MEASURED HORIZONTAL RADIATION PATTERN

TROY BROADCASTING CORPORATION

TROY, ALABAMA

FCC File No. BL-6530
Accepted 2/19/57

WTBF
Troy, Alabama

970 KC

WTBF

MEASURED NON-DIRECTIONAL (3/4/57g)

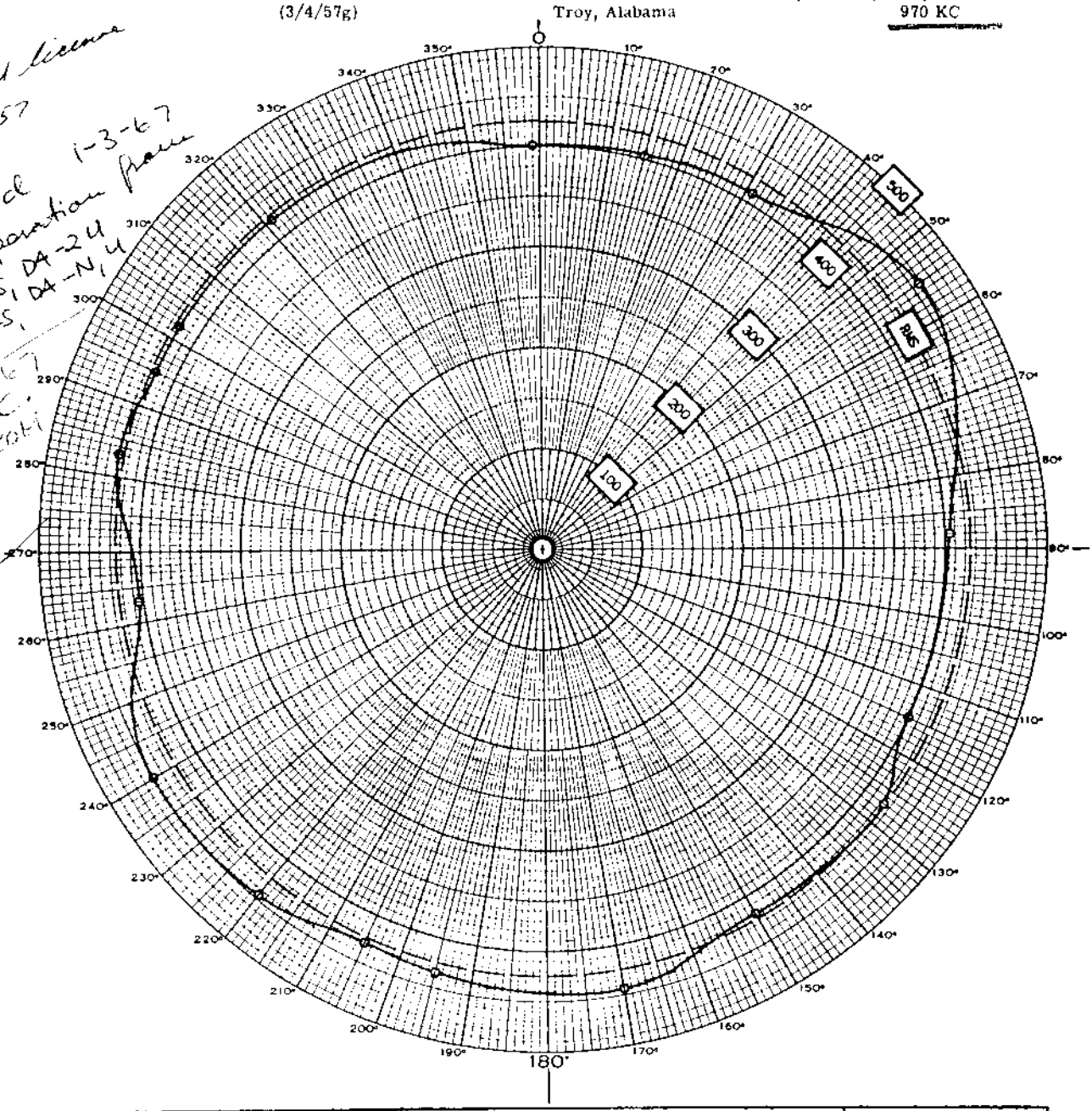
Station ~~WTBF~~ Troy, Alabama

500W,5KW-LS,DA-2,U 970 KC

granted license 4/3/57

BP-17468 appl. accepted 1-3-67 to change operation from 500W, 5KW-LS, DA-2U to 500W, 5KW-LS, DA-N, U

10-31-67 GRANTED LIC. CHANGES FROM DA-2, U TO DA-N, U



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA	
N025°E, N015°E, #3, #2, #1	TOWER No	ELECTRICAL HEIGHT G°	TRUE TOWER ORIENTATION β°	SPACING S°	PHASING ψ°	HORIZONTAL FIELD mv/m E	FIELD RATIO F	ELEV. ANGLE θ°	ELEVATION RMS FIELD mv/m E_θ	CALL	WTBF
	1							0		FREQUENCY	970 kc
	2	71°	000°	000°	000°		1.0	10		POWER	5.0 kw
	3							20		TIME OF OPERATION	ND (Prog)
	4							30		TYPE OF OPERATION	ND
	5							40		DAYTIME TOWERS	2
	6							50		NIGHTTIME TOWERS	XX
	7							60		No RADIALS PER TOWER	120
	8							70		LENGTH OF RADIALS	141 - 250 ft
	9							80		GROUND SCREEN DIMENSION	24 x 24°
	10							RMS	425 mv	LAT.	31° 50' 03.8"
	DAYTIME OPERATION ☐			NIGHTTIME OPERATION ☐				F_θ =	mv	LONG.	85° 56' 00.6"
										SUPERSEDES	
										PATTERN No.	561209A

CLAUDE M. GRAY
CONSULTING RADIO ENGINEER
BIRMINGHAM, ALA.

MEASURED HORIZONTAL RADIATION PATTERN

TROY BROADCASTING CORPORATION

TROY, ALABAMA

FCC File No. BL-6530
Accepted 2/19/57

WTBF
Troy, Alabama

970 KC

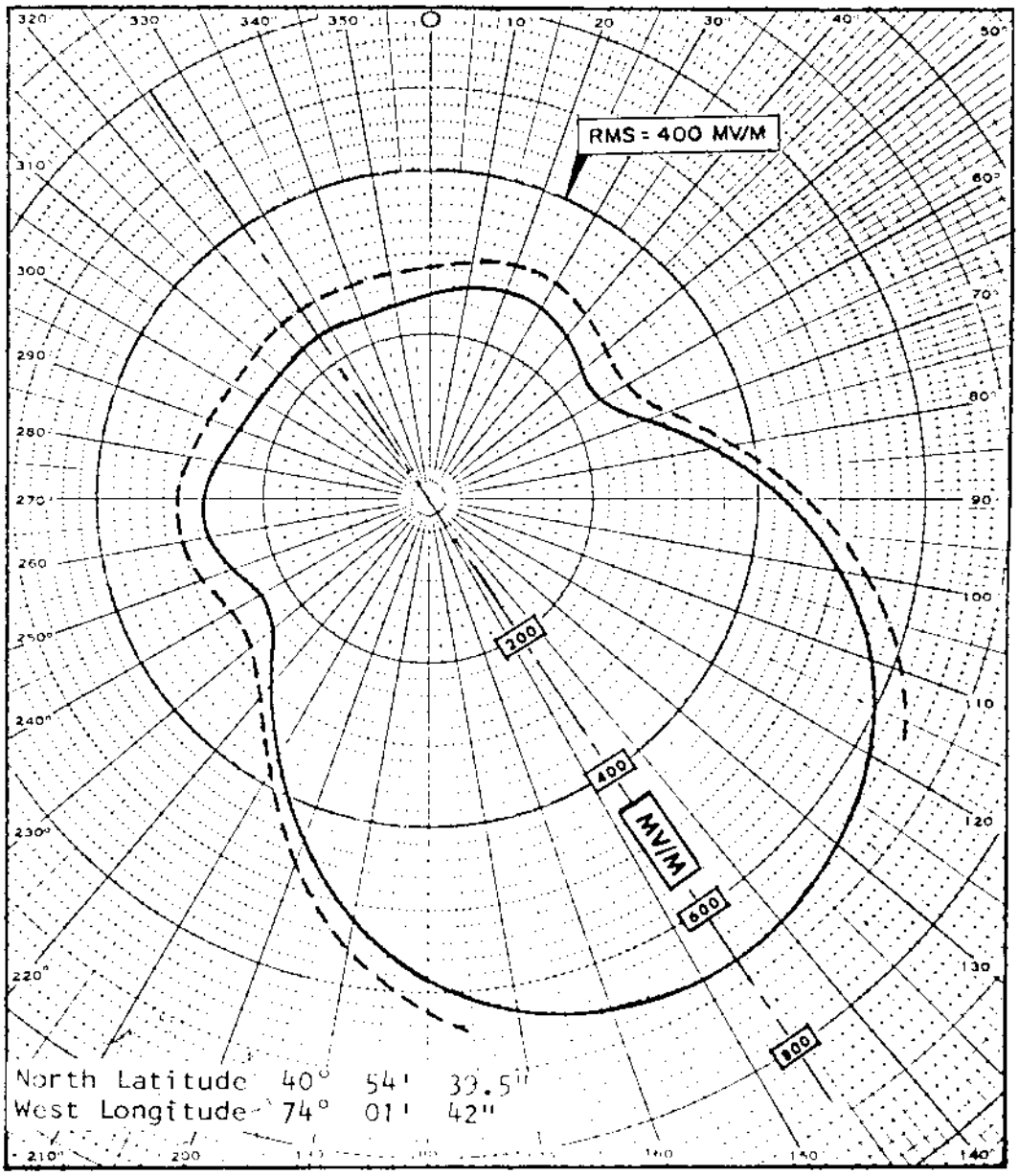
WWDJ

Proposed Day
(7-28-66ct)

Station WJRZ
Hackensack, New Jersey

970 kc

MCP 9-16-66



1.0/135.2° 1.77/36.6° 1.0/-135.2°

326°T ◎ — 90° → ◎ ← 90° → ◎

RMS = 400 MV/M G = 89°

PROPOSED DAYTIME RADIATION PATTERN
PATTERN NO. 660222
WJRZ - HACKENSACK, NEW JERSEY
970 KC - 5 KW - U - DA-2

APRIL, 1966

Gaultney & Jones — Consulting Radio Engineers

FCC File No. BMP-11846
Accepted 7-7-66

Station WJRZ
Hackensack, New Jersey

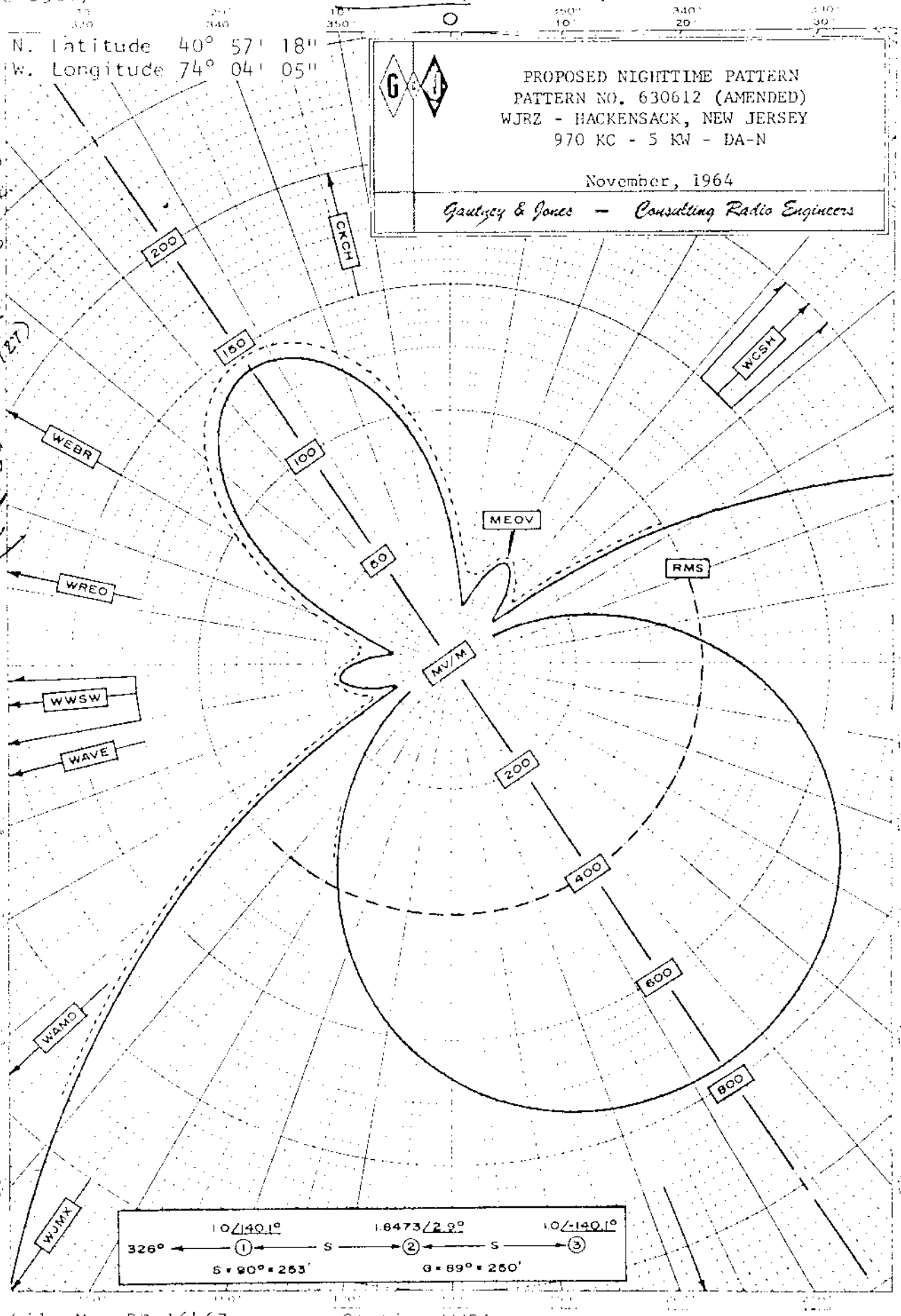
970 kc

Proposed Night
(1-28-65ct)

Station WJRZ
Hackensack, New Jersey

5kw **WWDJ**

N. Latitude 40° 57' 18"
W. Longitude 74° 04' 05"



FCC File No. BP-16467
Accepted 1-6-65 New Number

Station WJRZ
Hackensack, New Jersey

970 kc

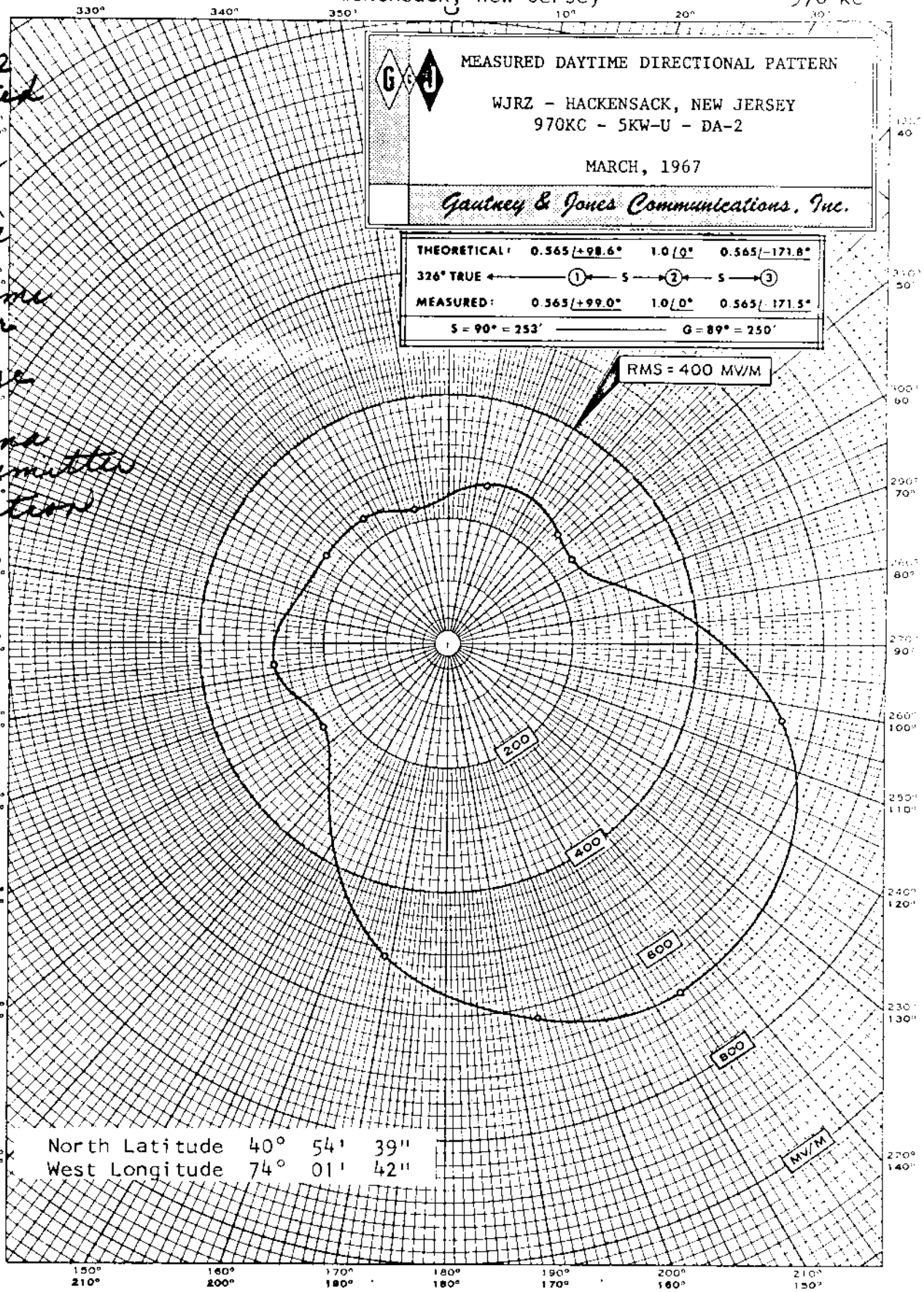
WWDJ

Measured Day
(7-26-67ct)

Station WJRZ
Hackensack, New Jersey

5kw,DA-2,U
970 kc

-BL-11672 Granted 9-16-68 license covering increase in nighttime power and change in antenna transmitter location



FCC File No.BL-11672
Accepted 7-3-67

Station WJRZ
Hackensack, New Jersey

970 kc

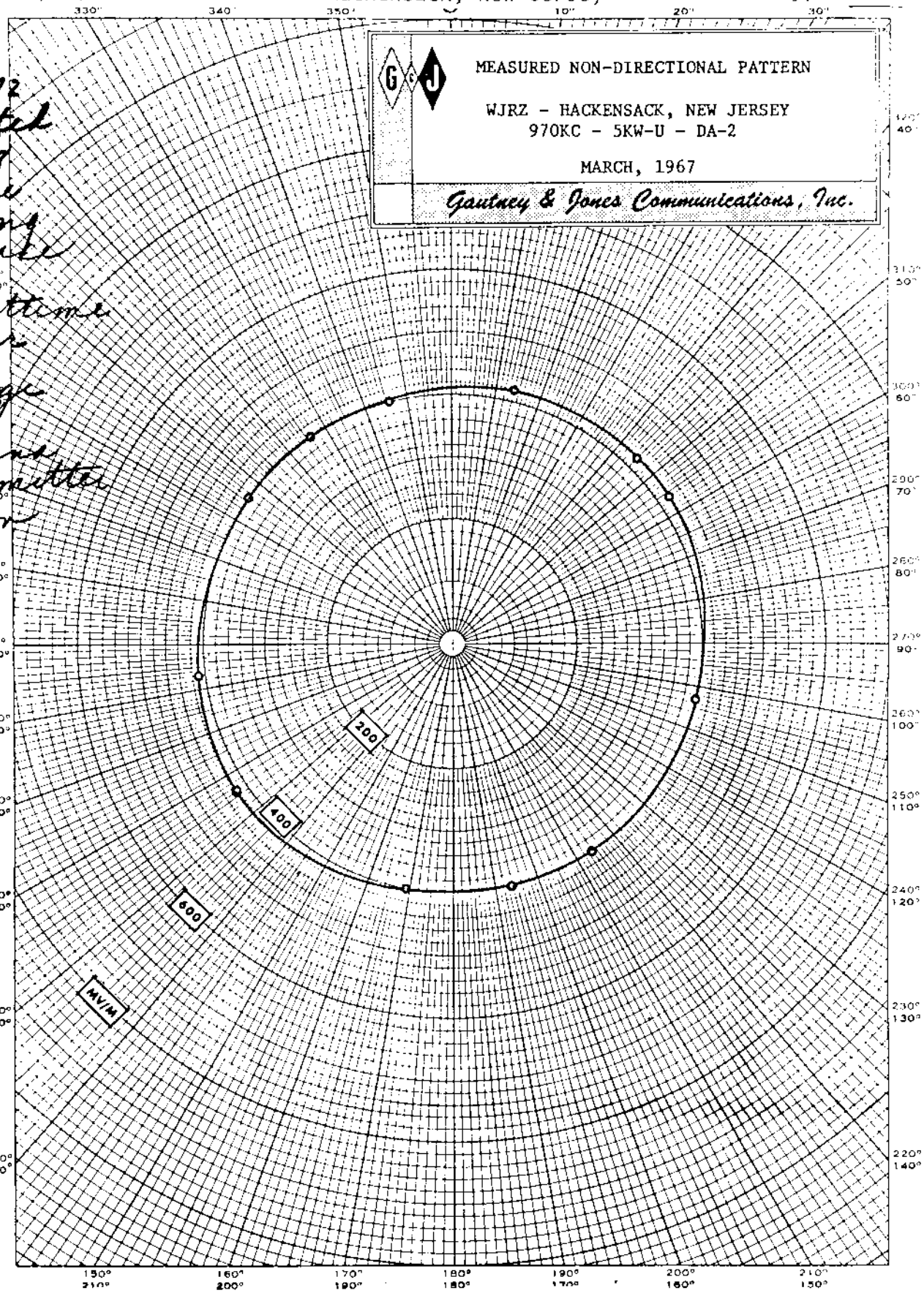
WWDJ

Measured Non-DA
(7-26-67ct)

Station WJRZ
Hackensack, New Jersey

5kw,DA-2,U
970 kc

BL-11672
Granted
9-16-68
license
covering
increase
in
nighttime
power
and
change
in
antenna
transmitter
location



FCC File No.BL-11672
Accepted 7-3-67

Station WJRZ
Hackensack, New Jersey

970 kc

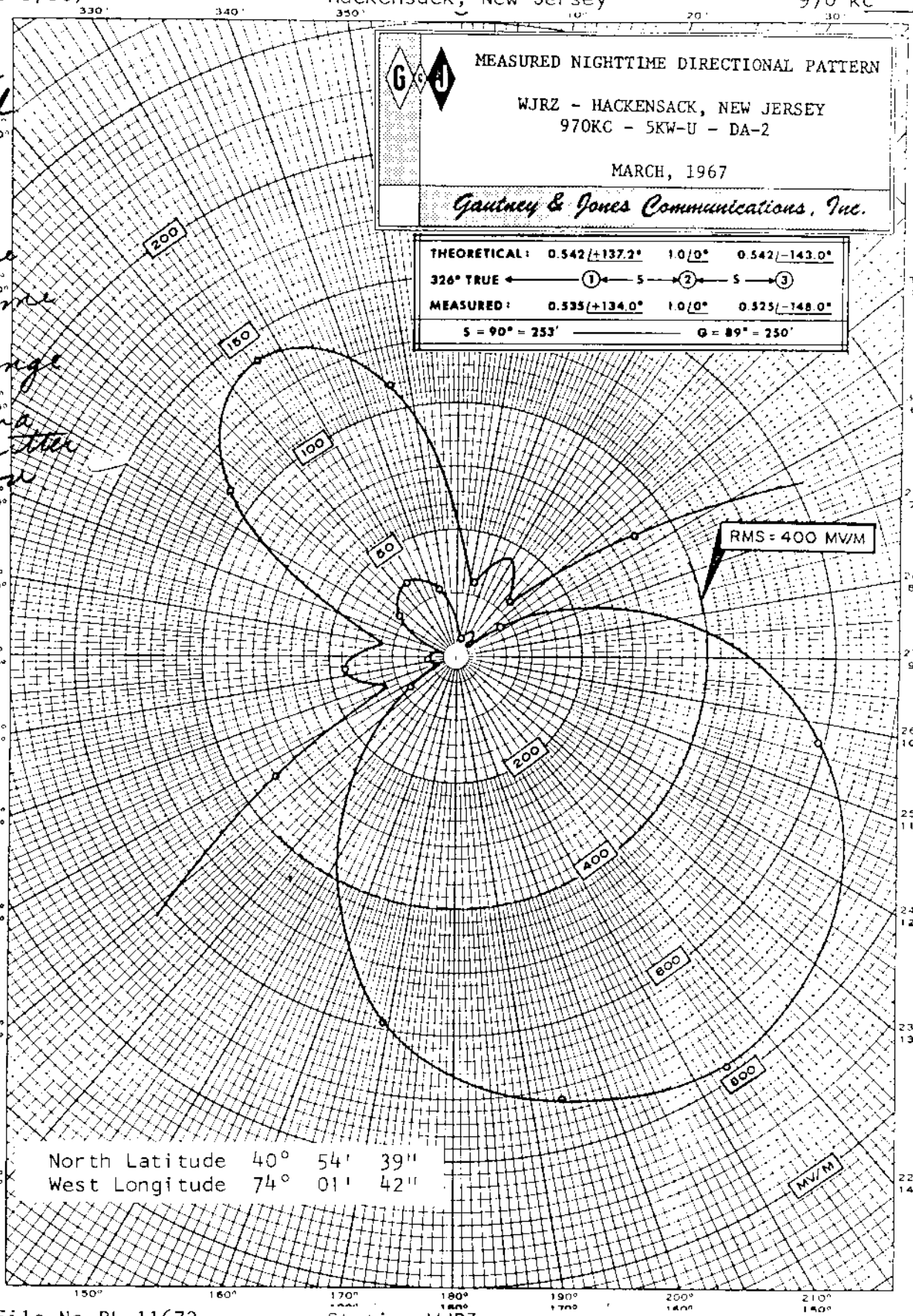
WWDJ

Measured Night
(7-26-67ct)

Station WJRZ
Hackensack, New Jersey

5kw, DA-2, U
970 kc

BL-11672 Granted 9-16-68 license covering increase in nighttime power and change in antenna transmitter location



FCC File No. BL-11672
Accepted 7-3-67

Station WJRZ
Hackensack, New Jersey

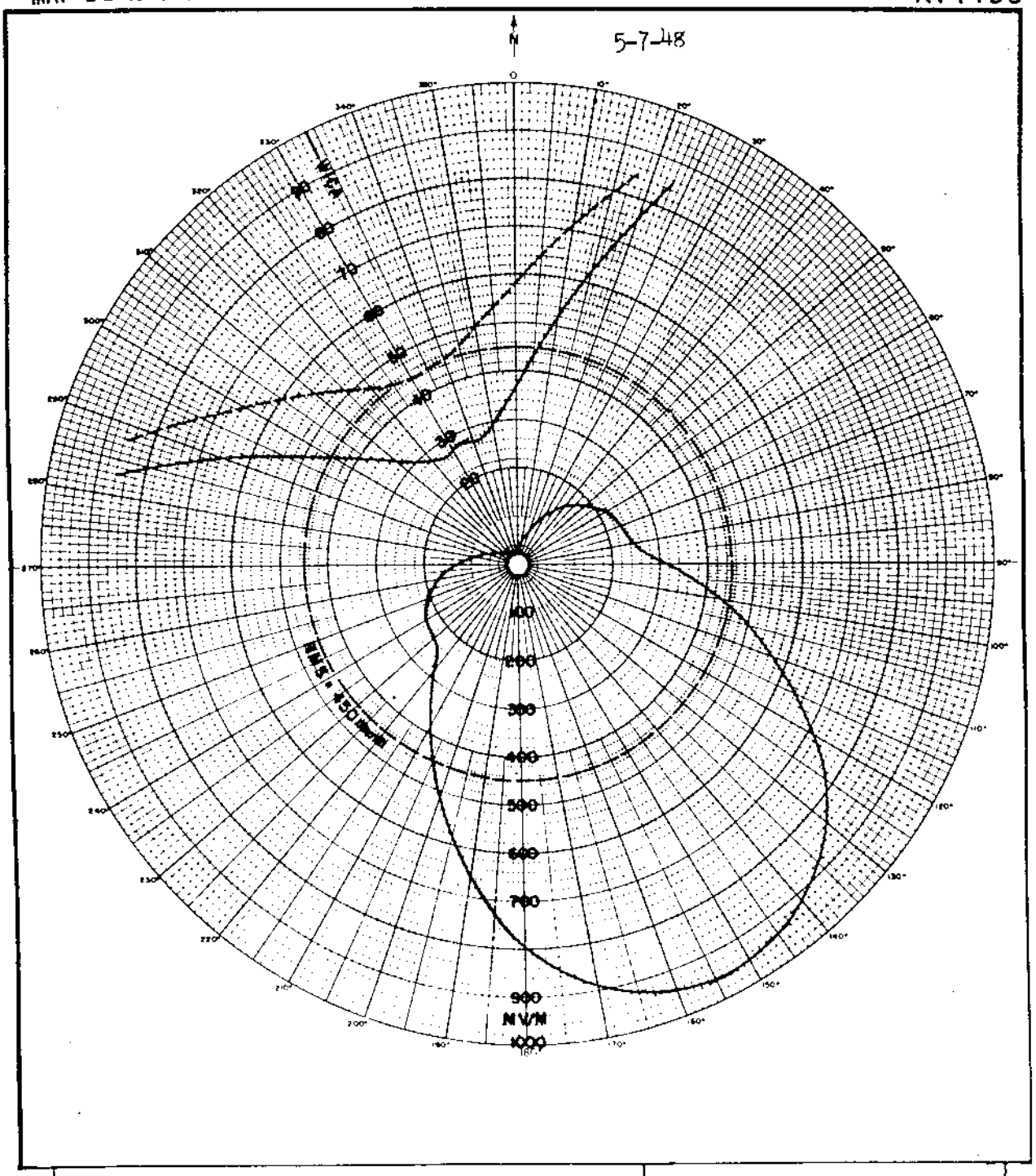
970 kc

970 KC - WWSW

MAY 11 1948 G

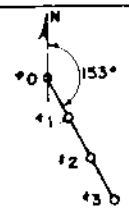
APP. 3C

5-7-48



ANTENNA PARAMETERS

Glenn D. Gillett And Associates
Consulting Radio Engineers
National Press Building
Washington, D.C.



Tower No.	Electrical Height 0°	Free Tower Orientation 0°	Spacing f°	Phasing g°	Horizontal Field mv/m d	Field Ratio r	Elev. Angle α°	Elevation RMS Field mv/m Y_a
0	90	—	—	+37	196	.80	0	450
1	90	153	75	-93.7	196	1.58	10	
2	90	153	75	+117.9	196	1.29	20	
3	90	153	75	-37	196	.58	30	
4							40	
5							50	
6							60	
7							70	
8							80	
9							Add Rms	
							Ant Gain	

WWSW
PITTSBURG, PA.

5 KW. DA-2 970 KC.

DAYTIME PATTERN

Latitude 40° 30' 30"
Longitude 80° 0' 30"

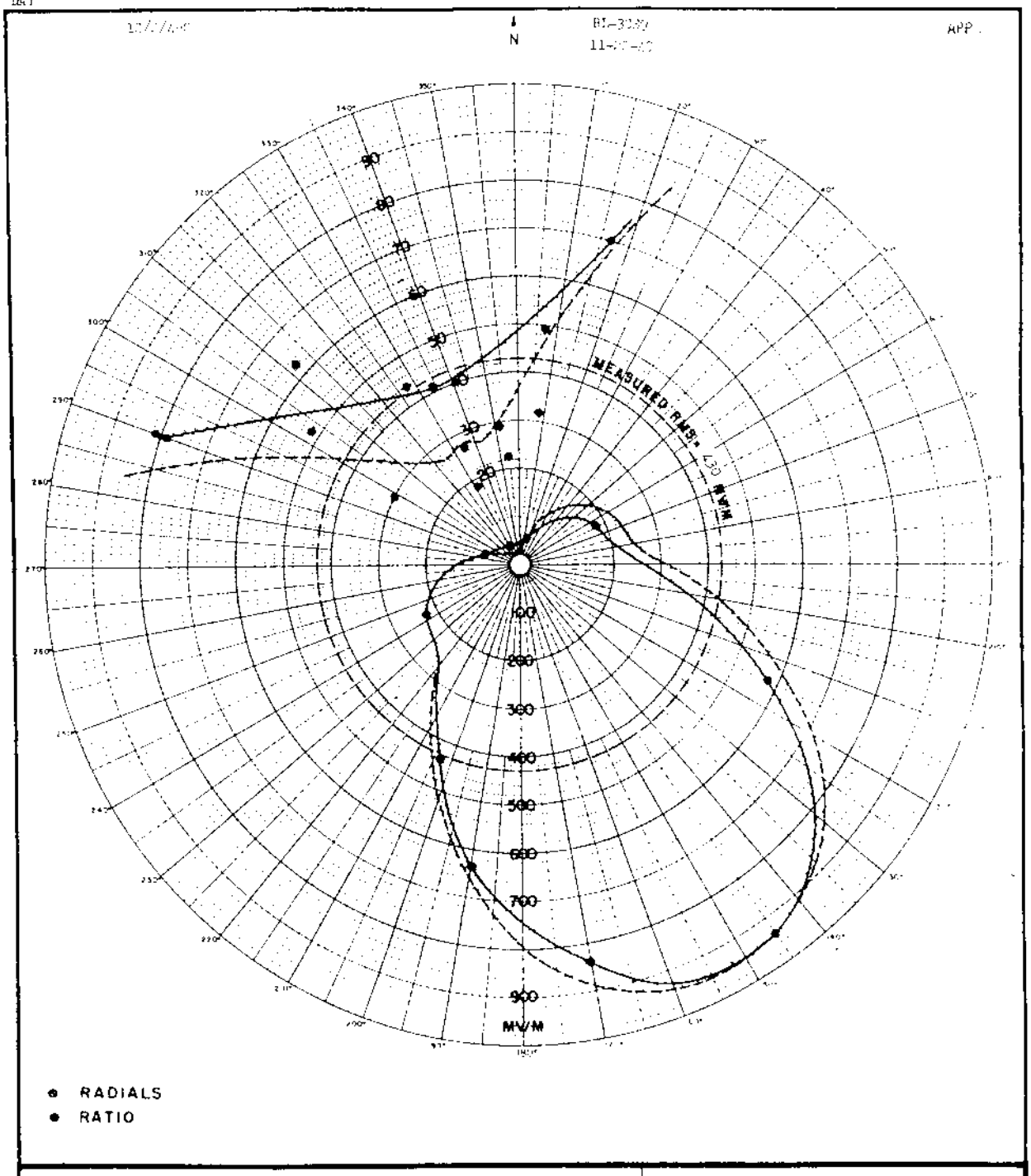
Supervision 470519
Pattern No. 480430

5-7-48

Proposed day

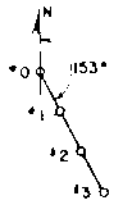
WWSW

MEASURED DAY | WWSW, PITTSBURGH, PA. | 5kw, DA-2 | 97[illegible]



ANTENNA PARAMETERS

Glenn D. Gillett And Associates
Consulting Radio Engineers
National Press Building
Washington, D.C.



Tower	Electrical Height	Tower Orientation	Spacing	Phasing	Horizontal Field	Field Ratio	Elev. Angle	Vertical Field
No.	°	°	°	°	E	I	°	E
0	90	0	0	37		0.60	0	
1	90	153	75	-93.7		1.58	10	
2	90	153	150	117.9		1.29	20	
3	90	153	225	-37		0.58	30	
4							40	
5							50	
6							60	
7							70	
8							80	
9							RSS	
							Abs Gain	

WWSW
PITTSBURG, PA.
5 KW DA-2 970 KC

DAYTIME
HORIZONTAL RADIATION
PATTERN

Latitude 40° 30' 30" | Antenna No. 480430
Longitude 80° 0' 30" | Pattern No. 491117

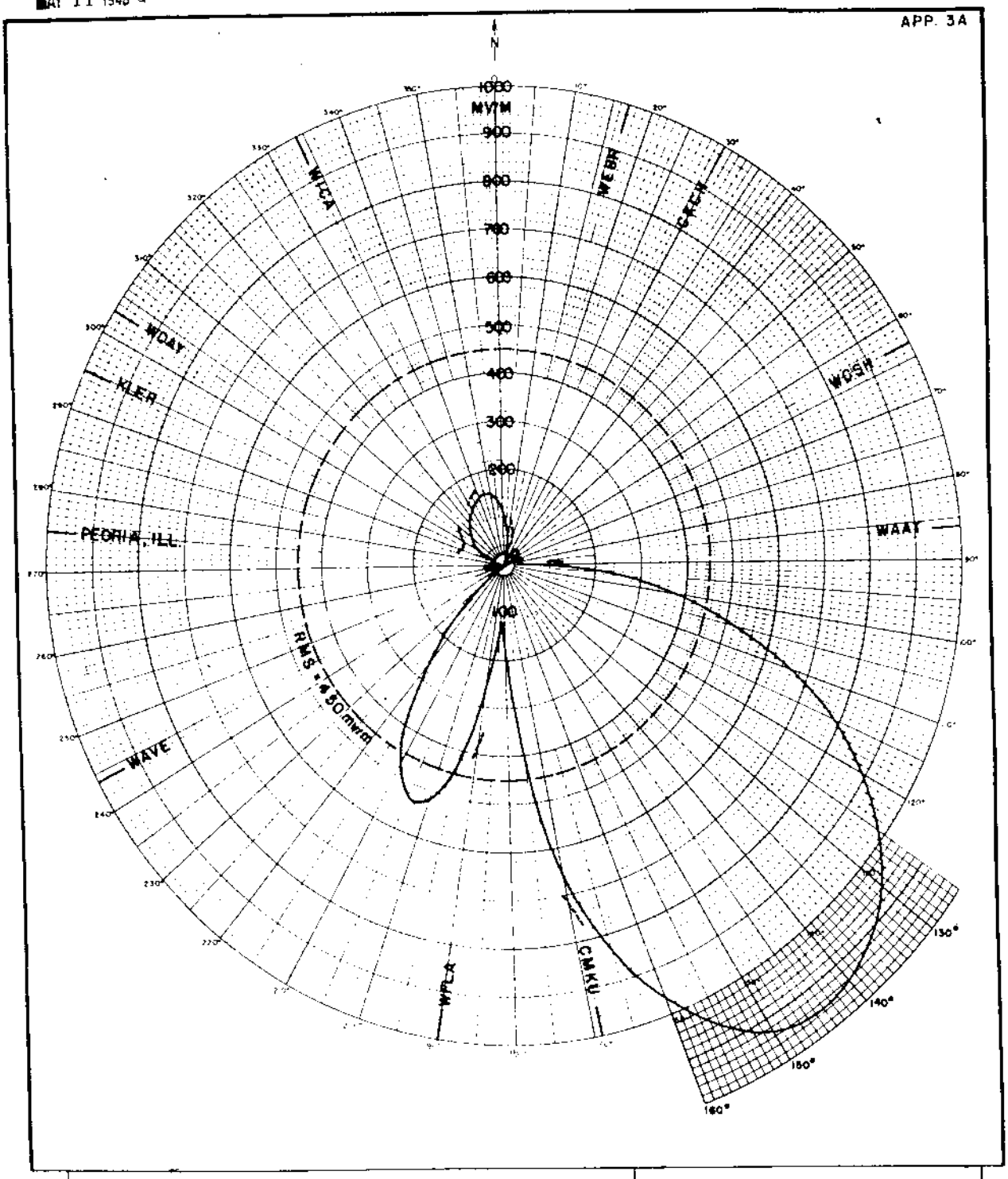
WWSW, Pittsburgh, Pa. 970 kc

970KC- WWSW

MAY 11 1948 G

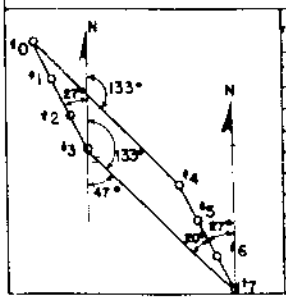
5-7-48

APP. 3A



ANTENNA PARAMETERS

Glenn D. Gillett And Associates
Consulting Radio Engineers
National Press Building
Washington, D.C.



Tower No.	Electrical Height G°	True Tower Orientation d°	Spacing S°	Phasing V°	Horizontal Field ratio I	Field Ratio F	Elev Angle θ°	Elevation Rect Field Rel. m. E
0	90	–	–	-111.5		1.0	0	450
1	90	153	75	97.8		2.17	10	418
2	90	153	75	-49.2		1.62	20	333
3	90	153	75	177.5		.4	30	216
4	90	133	391	-177.5		.8	40	108
5	90	136.2	462.5	31.8		1.74	50	63
6	90	138.5	534.5	-115.2		1.30	60	49
7	90	140.3	607.5	111.5		.32	70	29
8							80	6.8
9							RMS	207
							Ant. Gain	1.28

WWSW
PITTSBURG, PA.
5 KW. DA - 2 970 KC.

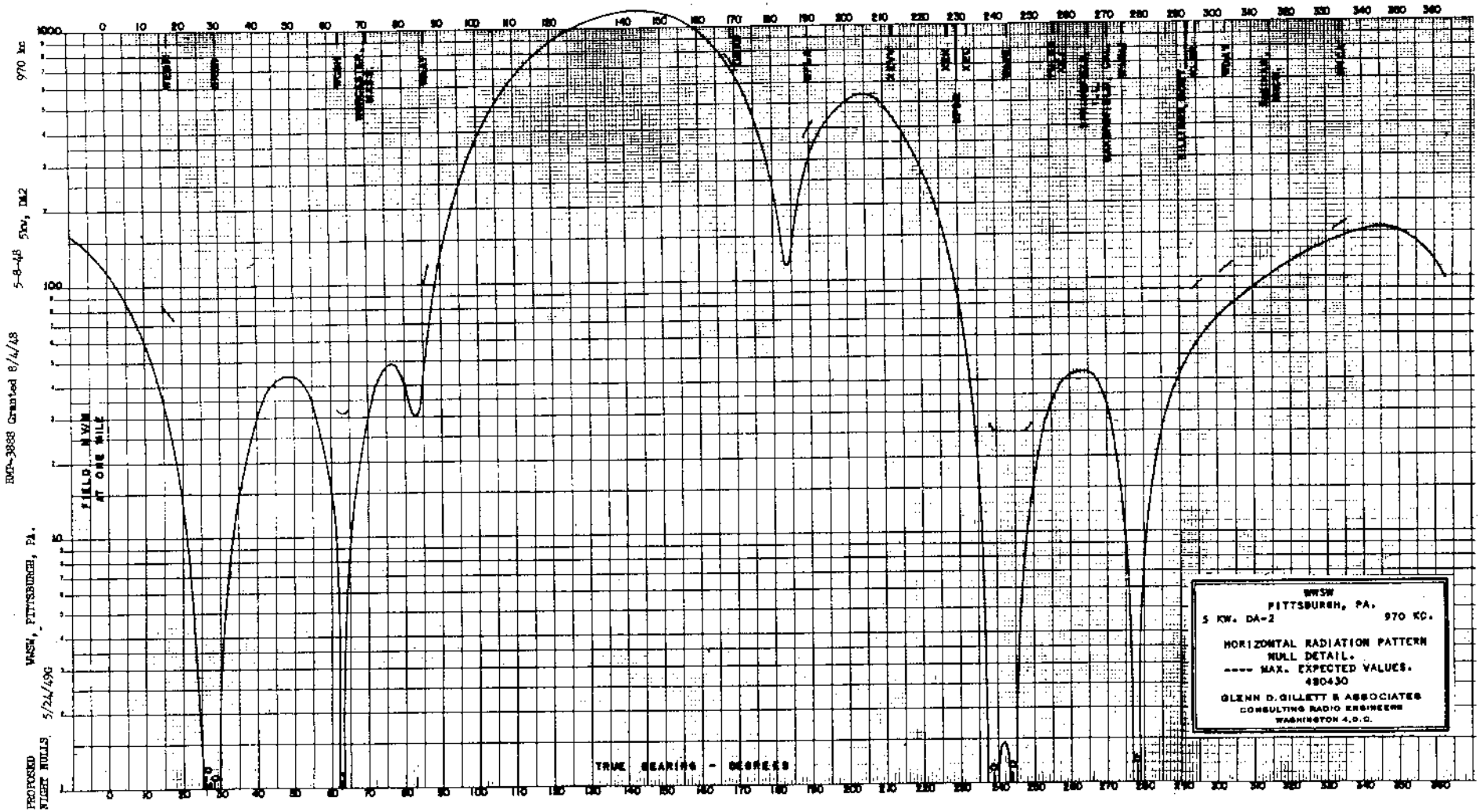
NIGHT TIME
HORIZONTAL RADIATION
PATTERN

Latitude 40° 30' 30"
Longitude 80° 0' 30"

Supervisor 470519
Pattern No. 480430

5-7-48

D. Sprague Mg'r

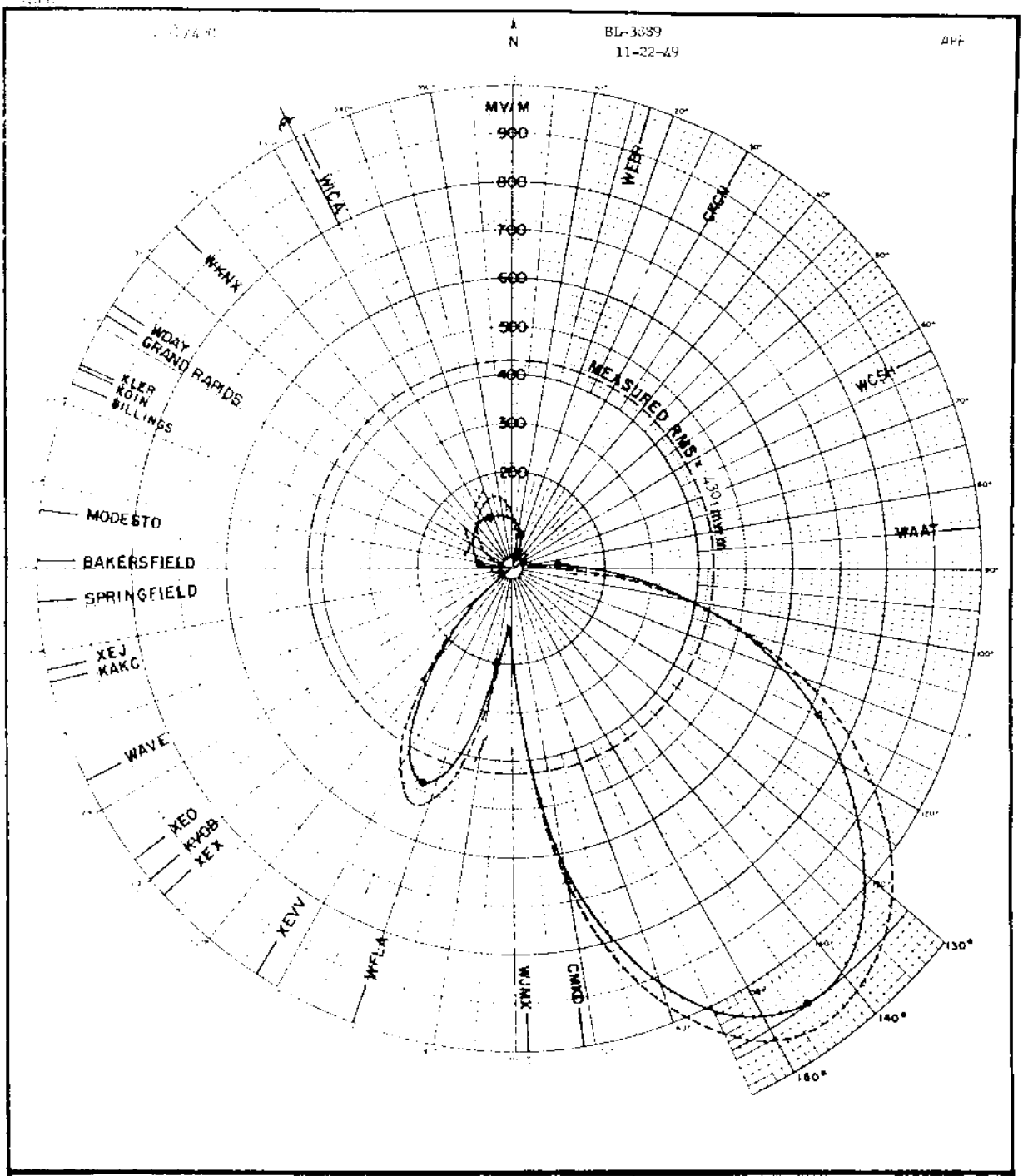

WWSW, Pittsburgh, Pa. 970 kc.
970 kc
5-8-48 5kw, DA2
BMP-3888 Granted 8/4/48
WWSW, PITTSBURGH, PA.
5/24/49G
PROPOSED NIGHT NULLS
FIELD, MVM AT ONE MILE
TRUE BEARING - DEGREES
WWSW
PITTSBURGH, PA.
5 KW. DA-2
970 KC.
HORIZONTAL RADIATION PATTERN
NULL DETAIL.
---- MAX. EXPECTED VALUES.
480430
GLENN D. GILLETT & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON 4, D.C.

970 KC - WWSW

WWSW

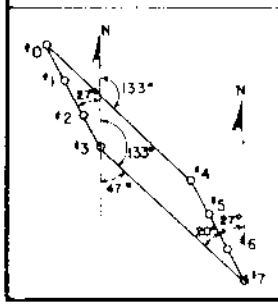
MASTER COPY Aug, 1950 Bell, IA. 5kw, DA-2 970 kc

BL-3389
11-22-49



ANTENNA PARAMETERS

Glenn D. Gillett And Associates
Consulting Radio Engineers
National Press Building
Washington, D.C.



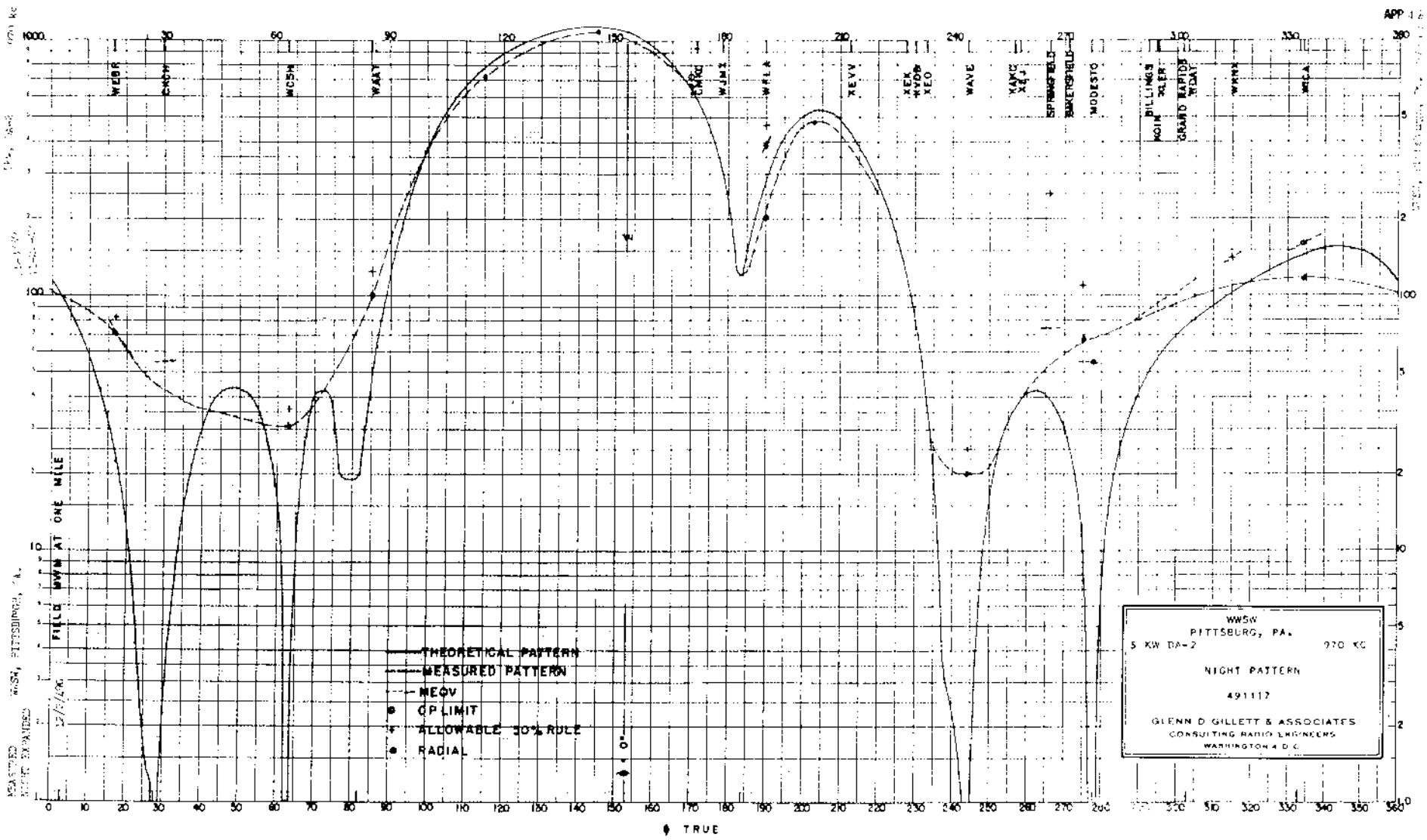
Tower	Physical Height	Time Phase (Electrical)	Spacing	Phase	Horizontal Field mv/m	Field Ratio	Elev. Angle	Elevation RMS Field mv/m
	'	°	'	°			°	
0	90	0	0	-111.5		1.0	0	
1	90	153	75	97.8		2.17	10	
2	90	153	150	-49.2		1.62	20	
3	90	153	225	177.5		0.4	30	
4	90	133	391	-177.5		0.8	40	
5	90	136.2	462.5	31.8		1.74	50	
6	90	138.5	534.5	-115.2		1.30	60	
7	90	140.3	607.5	111.5		0.32	70	
8							80	
9							RMS	2.07
							Ave Gain	14.28

WWSW
PITTSBURG, PA
5 KW DA-2 970 KC

NIGHTTIME
HORIZONTAL RADIATION
PATTERN

Latitude 40° 30' 30" Number 480430
Longitude 80° 0' 30" Date 491117

WWSW, Pittsburgh, Pa. 970 kc


APP 1
WEBR
KMOX
WCSH
WABY
WJMX
WHLA
KEVV
KEK
WYDR
KEO
WAVE
KANS
KJR
SPRINGFIELD
BAKERSFIELD
MODESTO
KOIN
BILLINGS
KLER
GRAND RAPIDS
WDAY
WHKK
WCCA
FIELD MV/M AT ONE MILE
THEORETICAL PATTERN
MEASURED PATTERN
MEQV
CP LIMIT
ALLOWABLE 30% RULE
RADIAL
WWSW
PITTSBURG, PA.
5 KW DA-2
970 KC
NIGHT PATTERN
491117
GLENN D GILLETT & ASSOCIATES
CONSULTING RADIO ENGINEERS
WASHINGTON 4 D.C.
TRUE

WWSW

DESCRIPTION SHEET - DIRECTIONAL ANTENNA

Station: NEW

Main Studio: Edson, Alberta

Frequency: 970 kHz

Power: 10 kW Class, III

Notification List: 239

Date: February 20, 1968.

GEOGRAPHICAL LOCATION: Latitude: 53° 32' 09" North
Longitude: 116° 36' 06" West

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-1
Number of Elements: Two (2)
Type of Elements: Guyed steel towers, uniform cross section, base insulated for series feed.

TOWER:	#1 SOUTH	#2 NORTH
HEIGHT ABOVE INSULATORS:	200' (71°)	200' (71°)
OVERALL HEIGHT:	205'	205'
FIELD RATIO:	1.0	.95
PHASING:	0°	-125°

GROUND SYSTEM: 120 equally spaced radials per tower of No. 10 B & S gauge bare copper wire, buried approximately 8". Length of radials 406' (0.4 wavelength) with the exception of those joined along the common chord.

SPACING AND ORIENTATION OF TOWERS:
Towers are on a line bearing 20° West of True North and are spaced 225.5' (80°) apart.

PREDICTED EFFECTIVE FIELD:

600 mv/m at 1 mile for 10 kW
189 mv/m at 1 mile for 1 kW

D. E. M. ALLEN, P. ENG. BROADCAST CONSULTING ENGINEER

Revised: November 23, 1967

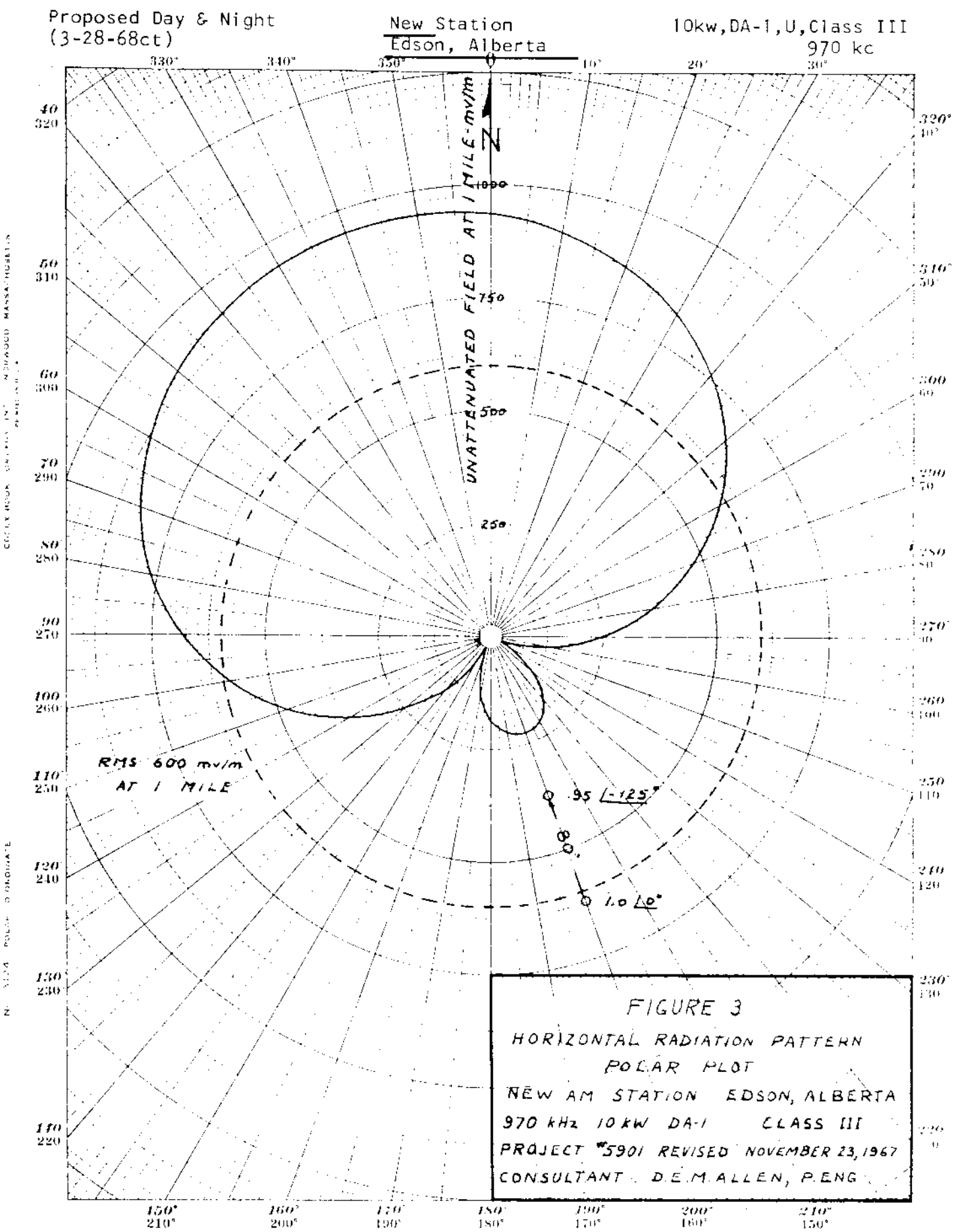


FIGURE 3
HORIZONTAL RADIATION PATTERN
POLAR PLOT
NEW AM STATION EDSON, ALBERTA
970 kHz 10 kW DA-1 CLASS III
PROJECT #5901 REVISED NOVEMBER 23, 1967
CONSULTANT D.E.M. ALLEN, P.ENG

Proposed Day & Night Nulls
(3-28-68ct)

New Station
Edson, Alberta

10kw,DA-1,U,Class III
970 kc

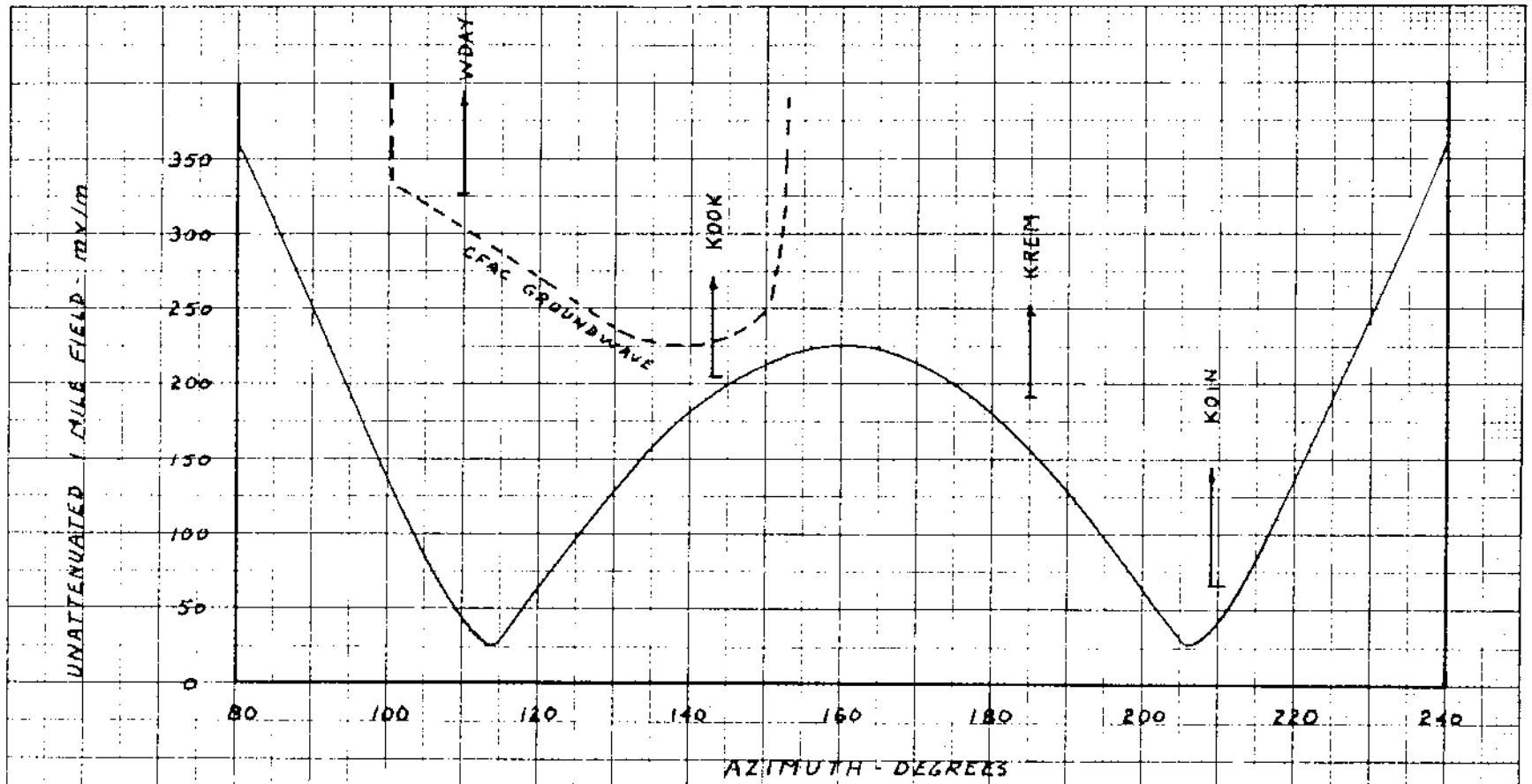


FIGURE 4

HORIZONTAL PATTERN - EXPANDED SCALE
NEW AM STATION EDSON, ALBERTA
970 kHz 10 kW DA-1 CLASS III
PROJECT #5901 REVISED NOVEMBER 23, 1967
CONSULTANT D.E.M. ALLEN P.ENG.

XEDF

Description Sheet
(11-29-62ct)

Station XEDF
Mexico, D.F.

5kw,10kw-LS,DA-N,U
970 kc ClassII

DESCRIPCION DEL SISTEMA DIRECCIONAL DE RADIACION

OPERACION NOCTURNA

AUGUST 1961

ESTACION:	**XEDF**
FRECUENCIA:	970 KHz.
CLASE.	II
	ESTUDIOS EN MEXICO, D.F.
	POTENCIAS: 10,000 W. DIURNOS. 5,000 W. NOCTURNOS
	LISTA DE CAMBIOS.
	FECHA. AGOSTO DE 1961.
LOCALIZACION GEOGRAFICA DEL SISTEMA RADIADOR.	LONGITUD O 99° 07' 19" LATITUD N 19° 29' 19"
AUTORIZADO PARA OPERACION.	A D N
NUMERO DE ELEMENTOS RADIADORES.	DOS.
TIPO DE ELEMENTOS RADIADORES.	TORRES VERTICALES DE ACERO DE SECCION UNIFORME TRIANGULAR SOPORTADAS CON RETENIDAS ALIMENTACION TIPO SERIE.

TORRES:	NORTE	SUR
ALTURA SOBRE LOS AISLADORES.	103.08 Mts. 120°	103.08 Mts 120°
SEPARACION ENTRE TORRES.	77.32 Metros.	(90°)
MAGNITUDES RELATIVAS DE CORRIENTES	1	1
DEFASAMIENTO.	120°	0°
AZIMUT DEL EJE DE LAS TORRES	MOSTRADO EN EL LOBULO HORIZONTAL = 41° 30' 00"	
RAIZ CUADRATICA MEDIA TEORICA.	446.4961 mV/M	
INTENSIDAD DE CAMPO R.C.M. NO ATENUADO A UNA MILLA POR KILOWATT DE POTENCIA RADIADA.	2025 mV/M	

APROBO

XEDF

Proposed Night
(11-29-62ct)

Station XEDF
Mexico, D.F.

5kw,10kw-LS,DA-N,U
970 kc ClassII